SONY

HD CAMCORDER

HDW-790
HDW-790P

The CD-ROM includes operation manuals for the HDW-790/790P HD Camcorder (English and Japanese versions). For details, see *"1-4 Using the CD-ROM Manual" on page 16*.

HDCAM Tele-File

MEMORY STICK ™

OPERATION MANUAL English

1st Edition (Revised 1)

WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

For the customers in the U.S.A.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

All interface cables used to connect peripherals must be shielded in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

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Perchlorate Material : Lithium battery contains perchlorate.

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Compliance with this directive implies conformity to the following European standards:
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• EN55103-2 : Electromagnetic Susceptibility (Immunity)
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Les accumulateurs aux ions de lithium sont recyclables. Vous pouvez contribuer à préserver l'environnement en rapportant les piles usées dans un point de collection et recyclage le plus proche.
Pour plus d'informations sur le recyclage des accumulateurs, téléphonez le numéro gratuit 1-800-822-8837 (Etats-Unis et Canada uniquement), ou visitez http://www.rbrc.org/
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• EN55103-2: Elektromagnetische Verträglichkeit (Störfestigkeit),
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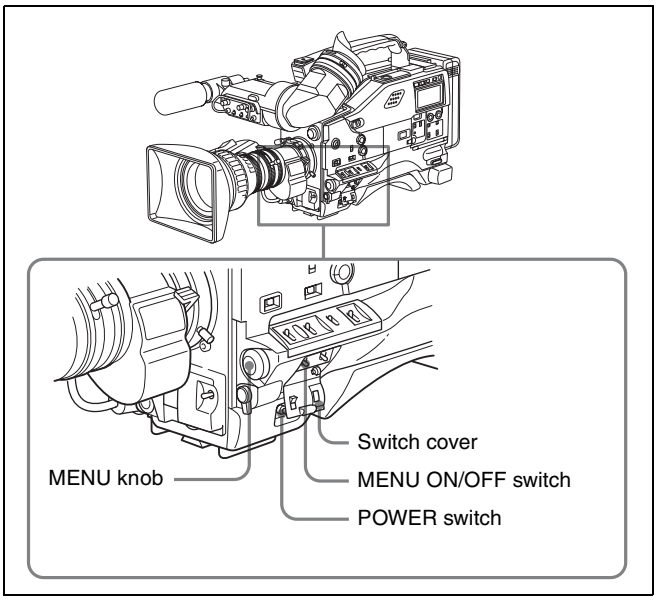
Setting the Frame Frequency

The factory setting of the frame frequency of the HDW-790 is 59.94i. On the HDW-790P, the frame frequency is factory-set to 50i. To use the camcorder with a format other than the one set at the factory, you should change the setting of the frame frequency first.



Note

In the procedure below, the HDW-790 is used for illustration purposes.

1 Set the POWER switch to ON.

2 Open the switch cover, and then set the MENU ON/OFF switch to ON while pushing the MENU knob.

The TOP menu appears.

```
      <TOP MENU>

➡USER
 USER MENU CUSTOMIZE
 ALL
 ·OPERATION
 ·PAINT
 ·MAINTENANCE
 ·FILE
 ·DIAGNOSIS
```

3 Turn the MENU knob to move the ➡ mark to MAINTENANCE, then push the MENU knob.

When the MAINTENANCE menu is used for the first time, the CONTENTS page appears.

When a question mark appears at the top left of the title page, you can switch pages by turning the MENU knob

```
?OO●CONTENTS        TOP
 ↑↓
 01.WHT SHADING
 02.BLK SHADING
 03.LEVEL ADJ
 04.SD LEVEL ADJ
 05.BATTERY
 06.AUDIO-1
 07.AUDIO-2
 08.AUDIO-3
 09.TIME CODE
 10.VTR MODE
```

Or, if you have used the MAINTENANCE menu before, the page that was on the screen when the last menu operation ended appears.

4 When the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➡ mark to FORMAT.

```
 OO CONTENTS        TOP
 ↑↑
 10.SHOT MARKER
 11.PRESET WHT
 12.DCC ADJUST
 13.AUTO IRIS 2
 14.FUNCTION 3
 15.FUNCTION 4
 16.GENLOCK
 17.ND COMP
➡18.FORMAT
 19.VANC RX
```

Or, turn the MENU knob until the FORMAT page appears from the CONTENTS page.
When any page of the MAINTENANCE menu is displayed, turn the MENU knob until the FORMAT page appears.

5 Push the MENU knob.

The FORMAT page appears.

```
 18 FORMAT          TOP
 CURRENT          : 59.94
➡NEXT             :●59.94
```

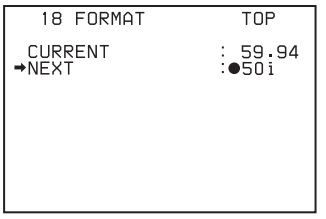
Frame frequency currently selected

6 Confirm the ➡ mark is positioned at NEXT, then push the MENU knob.

```
 18 FORMAT          TOP
 CURRENT          : 59.94
●NEXT             :?59.94
```

The ➡ mark to the left of NEXT changes to a ● mark, and the ● mark to the left of the setting changes to a ? mark.

7 Turn the MENU knob clockwise or counterclockwise until the desired frame frequency appears.



The message “PLEASE POWER OFF ➡ ON TO CHANGE FORMAT” appears.

8 Set the POWER switch to OFF once, and then to ON.

The camcorder will operate at the desired frame frequency.

Even if you do not push the MENU knob to execute the change, the frame frequency selected in step **7** becomes effective only by turning the power of the camcorder off and on again.

Chapter 1 Overview

1-1 Features

The HDW-790/790P camcorder is a color video camera with 1920 (H) × 1080 (V) effective picture elements; it incorporates 2/3-inch CCDs with 2,000,000 picture elements and an HDCAM format recorder combined integrally. The introduction of new integrated circuit technology (LSI) for processing the HD digital signal improves the image quality even further, and simplifies setup (initialization) operations.

Note

In this manual, the HDW-790 is used for illustration purposes.

1-1-1 Camera Features

$^{2}/_{3}$-inch Power HAD[1)] CCDs

The high sensitivity, low smear $^{2}/_{3}$-inch Power HAD CCDs (FIT-type CCDs) provide high image quality, which puts this HD camcorder at the top of its class.
The HDW-790 is compatible with the 59.94i and 50i formats. And the HDW-790P is compatible with the 50i and 25PsF formats.

1) Abbreviation of "Power Hole-Accumulated Diode." "Power HAD" is a registered trademark of Sony Corporation.

Camera signal processing for high quality video

- The 12-bit A/D converter provides stable, high-quality images and reliability.
- Blur-free shooting is ensured by a built-in, high performance electronic shutter that provides a variety of modes, such as ECS[1)] mode which reduces flickering on the monitor screen, and S-EVS[2)] mode that improves vertical resolution.

1) ECS: Extended Clear Scan
2) S-EVS: Super Enhanced Vertical Definition System

Shooting functions to cope with different shooting conditions

- With the scene file function, you can easily recall sets of adjustment values from the built-in memory, to match particular lighting conditions.
- The ATW[1)] function provides automatic white balance adjustment in response to changing lighting conditions.
- The TruEye™[2)] process yields distortion-free video, even with high intensity colors.
- The TURBO GAIN button enables an instantaneous boost of the video gain to the maximum 42 dB.

1) ATW: Auto Tracing White balance
2) TruEye: "TruEye" is a trademark of Sony Corporation.

Wide range of menu settings

The menus provide a wide variety of operations and settings, including:
- Status display, message, and marker display settings
- Camera adjustment settings
- Assignable switch function assignment
- "Memory Stick[1)]" operations

You can assign any settings to a USER menu, to create customized menus.

1) "Memory Stick" is a registered trademark of Sony Corporation.

Saving and recalling settings from a "Memory Stick"

Using an optional "Memory Stick," you can save menu settings for particular shooting conditions, for recall as required.

Down converter function

- Attaching an optional HKDW-702 extension board (converting to a 525/59.94i and 625/50i signal) allows you to monitor the camera image and playback image in 1080/59.94i, 1080/50i, and 1080/25PsF formats on an NTSC/PAL monitor.
- The HKDW-702 extension board makes it possible to output an SDI signal (corresponding to Embedded Audio).
- Three down-conversion modes are available: SQEZE, LETTR BOX and CROP.

Slow shutter mode function

Installing an optional HKDW-905R extension board enables the camcorder to store up to 64 frames. The slow shutter function is useful not only for shooting in extremely dark conditions without noise, but also for shooting moving objects with a special afterimage effect.

Image inversion function

Installing an optional HKDW-905R extension board, which has an anti-image inversion function, allows you to cancel the image inversion phenomena that occurs when a cine-lens converter is used.

Note

The slow shutter and image inversion functions of the optional HKDW-905R extension board cannot be used at the same time.

ARIB color bar output

When the HKDW-905R Slow Shutter and Image Inverter Board is installed and when the OUTPUT/DCC switch is set to BARS, ARIB multi-format color bar signal is output.

Remote control connectors

By connecting an optional RM-B150/B750 or similar remote control unit, you can control the camera settings of the camcorder externally.

1-1-2 VTR Features

HDCAM format

- Use of the HDCAM format allows high performance HD digital recording and playback while preserving the same ease of use as conventional camcorder equipment.
- The same cassette size (S size) as Digital Betacam can be used to achieve the following long recording times.
  For 30 frames (59.94i): Approximately 40 minutes
  For 25 frames (50i and 25PsF): Approximately 48 minutes

Time Code operations

- LTC[1] and VITC[2] recording and LTC playback are available.
- The built-in time code generator can be synchronized with an external generator.
- A lithium battery provides the back-up power supply for the built-in time code generator enabling the camcorder to hold the time code for approximately 5 years without supplying the power to the camcorder.
- The time code can be displayed in the LCD window screen even when the power is off. The automatic power shut-off function allows you to set the time to be displayed from among three patterns.

1) LTC: Longitudinal Time Code
2) VITC: Vertical Interval Time Code

Picture cache recording/interval recording function

Installing an optional HKDW-703 extension board allows the camcorder to constantly store a few seconds (up to 8 seconds) of the most current picture and sound data in the board's memory. As a result, when you press the VTR START button, the recording starts with the data stored a few seconds before. Installing an optional HKDW-703 extension board enables the camcorder to record pictures intermittently.

Other VTR functions

- Recording continuity from the very next frame is ensured.
- You can automatically rewind and review the last 2 seconds of the recording on the tape for a quick check immediately after shooting.
- A four-times-normal speed color search function provides quick positioning of the tape.
- With the RE-TAKE function, the camcorder searches for the most recently recorded cut and records the new cut over it.
- With the End-Search function, the camcorder searches for the point most recently recorded on the tape and automatically switches to recording pause mode (REC pause).
- The freeze function is provided to obtain a freeze-frame picture from the playback picture on the VTR by pressing the STOP button during playback.
- The camcorder is compatible with the Tele-File[1] Memory Label system. When you press the RET button on the lens while recording, the time code valid when you pressed the button is recorded on an optional MLB-1M-100 memory label attached to the cassette. This is very helpful for management of cassette tapes and to improve the efficiency of tape editing.

1) Tele-File: The Tele-File system is a non-contact data reading/writing system that allows data about recorded material to be stored on a tape label with a non-contact IC memory.

1-1-3 Other Features

HD-SDI output connectors

Two HD-SDI (Embedded Audio) output connectors allow you to monitor camera and playback images without attaching a camera adaptor.

Audio functions

- The MIC IN (microphone input) connector (XLR type, 5-pin, female) allows you to connect the supplied stereo microphone. You can record either stereo or monaural sound.
- An optional slot-in UHF portable tuner, WRR-855A/855B, can be attached.
- The two AUDIO IN connectors (XLR type, 3-pin) on the rear panel can be switched to line input, microphone input, or + 48V external power, and also to AES/EBU digital audio inputs.
- Four channels of 20-bit digital audio can be recorded.
- The AUDIO OUT connector (XLR 5-pin) allows the camcorder to output signals as stereo audio.

Proper balancing design

The camcorder features a new shoulder-pad system that enables you to adjust the front-to-rear direction position (to ensure proper balance) without the use of any tools.

Freeze Mix function

Apart from the freeze function to obtain a freeze-frame picture from the playback picture on the VTR, a freeze-frame picture of the video signal input from the camera can be obtained. The obitained freeze-frame picture and the video from the camera can then be mixed and displayed. This function is available only when the HKDW-905R Slow Shutter and Image Inverter Board is installed.

Function extension interface and optional boards

An extension connector can be attached to the battery attachment on the rear panel.
Use of the following optional boards permits you to expand the existing functions.

- HKDW-702 Down Converter Board
- HKDW-703 Picture Cache Board
- HKDW-905R Slow Shutter and Image Inverter Board

1-2 Example of System Configuration

The diagram below shows a typical configuration of the camcorder for ENG and EFP.
In this manual, an optional HDVF-20A HD Electronic Viewfinder is used to instruct how to operate the unit.

For more information about the fittings, connections, or use of additional equipment and accessories, see "Chapter 7 Setting Up the Camcorder" as well as the operation manuals for the connected equipment.

Viewfinder-related equipment

Name / Purpose	Magnification	Part No.
Fog-proof filter	—	1-547-341-11
Lens assembly	–2.8 D to +2.0 D	A-8262-537-A
Lens assembly	–3.6 D to –0.8 D	A-8262-538-A
Lens assembly	–3.6 D to +0.4 D	A-8267-737-A
Lens assembly (3 × magnification)	–2.4 D to +0.5 D	A-8314-798-A

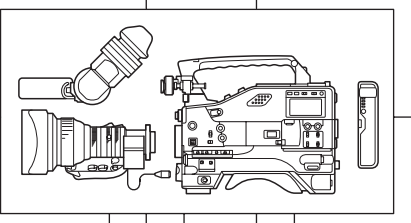
BKW-401 Viewfinder Rotation Bracket

AC power supply

Product	Model name
AC Adaptor	AC-DN10

Battery

Product	Model name
Battery Charger	BC-L70/M150
Battery Pack	BP-GL65/GL95/L60S



Viewfinder

HDVF-20A HD Electronic Viewfinder
HDVF-C30W HD Electronic Viewfinder

Audio input signals

External microphone ECM-674/678 or similar microphone
CAC-12 Microphone Holder

Analog audio equipment
CCXA-53 audio cable

WRR-861A/861B/862A/862B UHF Portable Tuner
WRR-855A/855B UHF Synthesized Tuner Unit

Extension board

Product	Model name
Down Converter Board	HKDW-702
Picture Cache Board	HKDW-703
Slow Shutter and Image Inverter Board	HKDW-905R

Video output

Video monitor for color image check during shooting

Audio output

Audio equipment for monitoring (XLR 5-pin connector)

Control signals

RM-B150/B750 Remote Control Unit

"Memory Stick" *(see page 143)*

1-3 Precautions

Use and Storage

Do not subject the unit to severe shocks

The internal mechanism may be damaged or the body warped.

After use

Always turn off the power.

Before storing the unit for a long period

Remove the battery pack.

Use and storage locations

Store in a level, ventilated place. Avoid using or storing the unit in the following places:

- Places subject to temperature extremes
- Very damp places
- Places subject to severe vibration
- Near strong magnetic fields
- In direct sunlight or close to heaters for extended periods

To prevent electromagnetic interference from portable communications devices

The use of portable telephones and other communications devices near this unit can result in malfunctions and interference with audio and video signals.
It is recommended that the portable communications devices near this unit be powered off.

Note on laser beams

Laser beams may damage the CCDs. If you shoot a scene that includes a laser beam, be careful not to let the laser beam be directed into the lens of the camera.

Phenomena specific to CCD image sensors

The following phenomena that may appear in images are specific to CCD (Charge Coupled Device) image sensors. They do not indicate malfunctions.

White flecks

Although the CCD image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc. This is related to the principle of CCD image sensors and is not a malfunction.

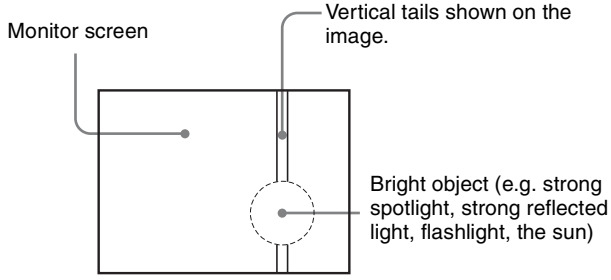
The white flecks especially tend to be seen in the following cases:

- when operating at a high environmental temperature
- when you have raised the master gain (sensitivity)
- when operating in Slow-Shutter mode

This product has a compensation function and the problem may be alleviated by automatic black balance adjustment *(see page 59)*.

Vertical smear

When an extremely bright object, such as a strong spotlight or flashlight, is being shot, vertical tails may be produced on the screen, or the image may be distorted.


Monitor screen
Vertical tails shown on the image.
Bright object (e.g. strong spotlight, strong reflected light, flashlight, the sun)

Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flicker.

1-4 Using the CD-ROM Manual

The supplied CD-ROM includes versions of the Operation Manual for the HDW-790/790P in English and the HDW-790 in Japanese in PDF format.

1-4-1 Preparations

The following program must be installed on your computer in order to read the operation manuals contained on the CD-ROM.

- Adobe Reader Version 6.0 or higher

Memo

If Adobe Reader is not installed, you can download it from the following URL:
http://www.adobe.com/

Adobe and Adobe Reader are trademarks of Adobe Systems Incorporated in the United States and/or other countries.

1-4-2 Reading the CD-ROM Manual

To read the operation manual contained on the CD-ROM, do the following.

1 Insert the CD-ROM in your CD-ROM drive.

A cover page appears automatically in your browser. If it does not appear automatically in the browser, double-click on the index.htm file on the CD-ROM.

2 Select and click on the operation manual that you want to read.

This opens the PDF file of the operation manual.

Memo

The files may not be displayed properly, depending on the version of Adobe Reader. In such a case, install the latest version you can download from the URL mentioned in *"1-4-1 Preparations"* above.

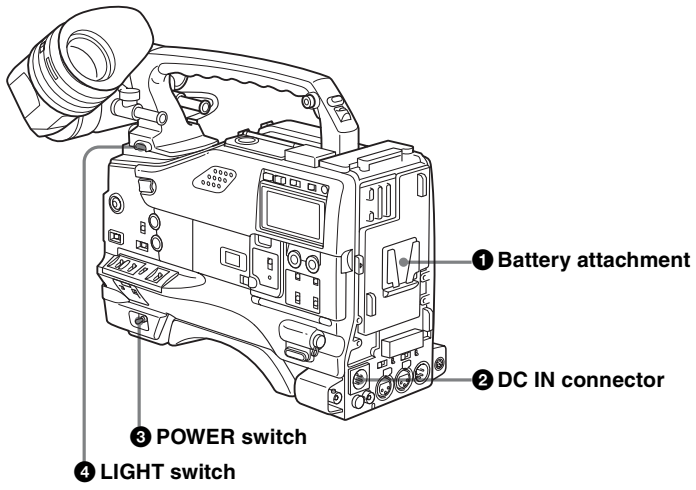
Note

If you have lost or damaged the CD-ROM, you can purchase a new one to replace it. Contact your Sony service representative.

Locations and Functions of Parts and Controls

Chapter 2

2-1 Power Supply



❶ Battery attachment
Attach a battery pack, BP-GL65, BP-GL95, or BP-L60S. Alternatively, by attaching an AC-DN10 AC Adaptor, you can operate the camcorder from AC power.

❷ DC IN connector (XLR type, 4-pin, male)
To operate the camcorder using an AC power supply, connect an AC-550/550CE AC Adaptor with the DC output cable supplied with the adaptor.
To use an external battery, connect its DC output cable to the DC IN connector.
When this connector is not being used, attach the supplied XLR connector cover onto it.

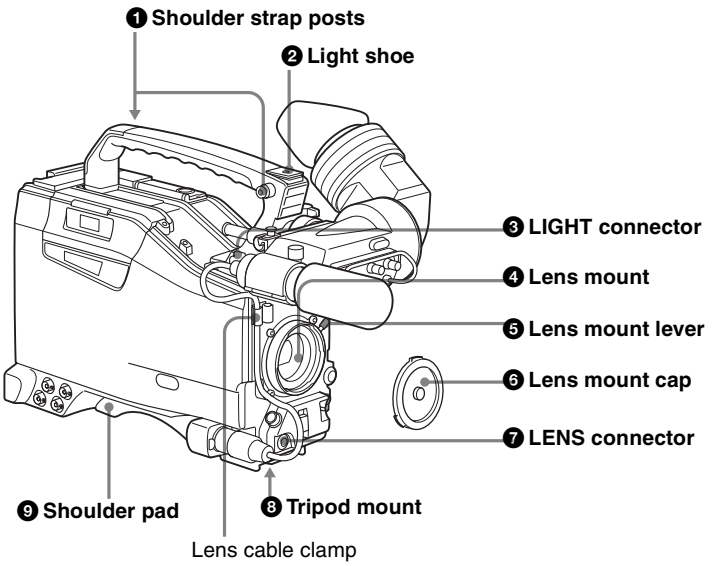
❸ POWER switch
Turns the main power supply on and off.

❹ LIGHT switch
Determines how a video light connected to the LIGHT connector is turned on and off.

AUTO: When the switch on the video light is in the on position, putting the camcorder in recording mode turns the video light on automatically. When using the auto interval recording mode, the video light is automatically turned on immediately before recording starts.

MANUAL: You can turn the video light on or off manually, using its own switch.

2-2 Accessory Attachments



❶ Shoulder strap posts
Attach the supplied shoulder strap to these posts.

For details, see "7-7 Attaching/Detaching the Shoulder Strap" on page 128.

❷ Light shoe
Attach an optional accessory such as a video light to this shoe.

❸ LIGHT connector (2-pin, female)
Connect the cable of an Anton Bauer Ultralight System attached to the light shoe. The system operates with lights powered by 12 V, with a maximum power consumption of 50 W.

❹ Lens mount (special bayonet mount)
Use this for mounting the lens.

❺ Lens mount lever
After inserting the lens in the lens mount, rotate the lens mount ring with this lever to lock the lens in position.

❻ Lens mount cap
Remove this cap by pushing up the lens mounting lever. When no lens is mounted, keep this cap fitted for protection from dust.

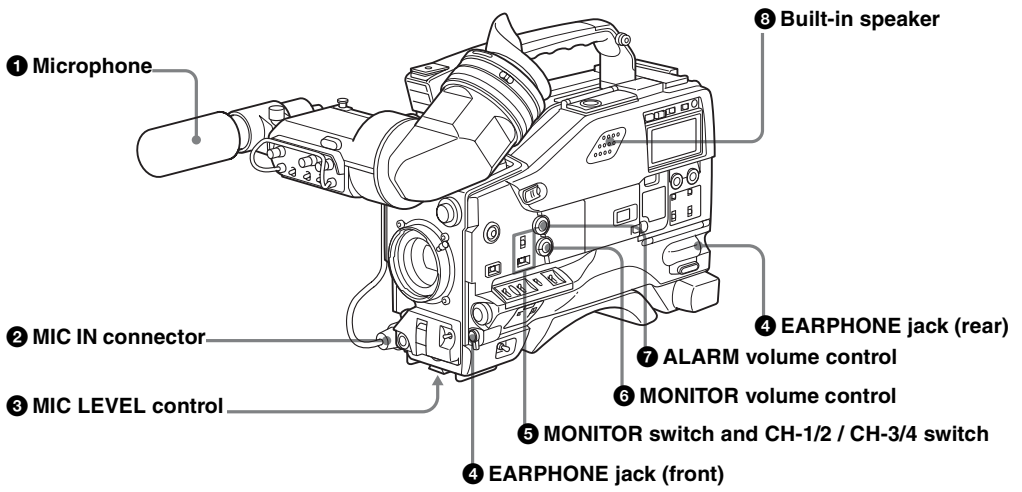
❼ LENS connector (12-pin)
Fit the lens cable to this connector. Contact your Sony representative for more information about the lenses you can use.

❽ Tripod mount
When using the camcorder on a tripod, attach the tripod adaptor (optional).

❾ Shoulder pad
You can move the shoulder pad forwards or backwards by raising up the shoulder pad locking lever. Do this to ensure the best balance when shooting with the camcorder on your shoulder.

For details, see "7-8 Adjusting the Shoulder Pad Position" on page 129.

2-3 Audio Functions


❶ Microphone
❽ Built-in speaker
❷ MIC IN connector
❸ MIC LEVEL control
❹ EARPHONE jack (rear)
❼ ALARM volume control
❻ MONITOR volume control
❺ MONITOR switch and CH-1/2 / CH-3/4 switch
❹ EARPHONE jack (front)

Audio functions (1)

❶ Microphone

This is a supplied directivity super-cardioid stereo microphone with an external power supply (+48 V) system.
Assigning the F.MIC MONO/STEREO function to the ASSIGN 1 switch, ASSIGN 2 switch, or TURBO GAIN button allows you to switch the output signal of the microphone connected to the MIC IN connector between stereo and monaural sound.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

❷ MIC IN (microphone input) connector (XLR type, 5-pin, female)

Connect the supplied microphone to this connector. A microphone other than the supplied one may also be connected if it can operate with the power (+48 V) supplied from this connector.

❸ MIC (microphone) LEVEL control

Adjusts the audio level of the microphone connected to the MIC IN connector.

❹ EARPHONE jacks (minijacks)

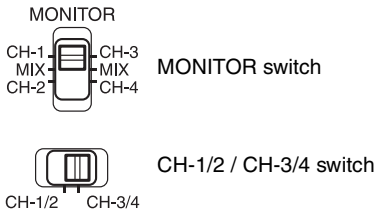
You can monitor the E-E sound [1)] during recording and play back sound during playback. Plugging an earphone into the jack automatically cuts off the built-in speaker. When an alarm is indicated, you can hear the alarm sound through the earphone.

You can connect earphones to both connectors at the same time.

1) E-E: Abbreviation of "Electric-to-Electric." In E-E mode, video and audio signals input to the camcorder are output after passing through internal electric circuits only. This can be used to check input signals.

❺ MONITOR switch and CH-1/2 / CH-3/4 switch

Determine the channel selection for audio monitor output.



CH-1/2 / CH-3/4 switch:

Determines the pair of audio channels selected with the MONITOR switch.
CH-1/2 position: channels 1 and 2
CH-3/4 position: channels 3 and 4
The signals output from the AUDIO OUT connector and EARPHONE jacks and the audio level meter in the display window also depend on the setting of this switch.

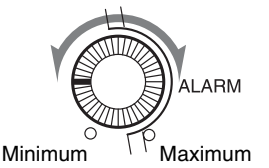
MONITOR switch:

Selects the audio monitor channels output to the earphone or speaker, depending on the setting of the CH-1/2 / CH-3/4 switch.

CH-1/2 / CH-3/4 switch position	MONITOR switch position	Audio output
CH-1/2	CH-1	Audio channel 1
	MIX	Mix sound of channels 1 and 2
	CH-2	Audio channel 2
CH-3/4	CH-3	Audio channel 3
	MIX	Mix sound of channels 3 and 4
	CH-4	Audio channel 4

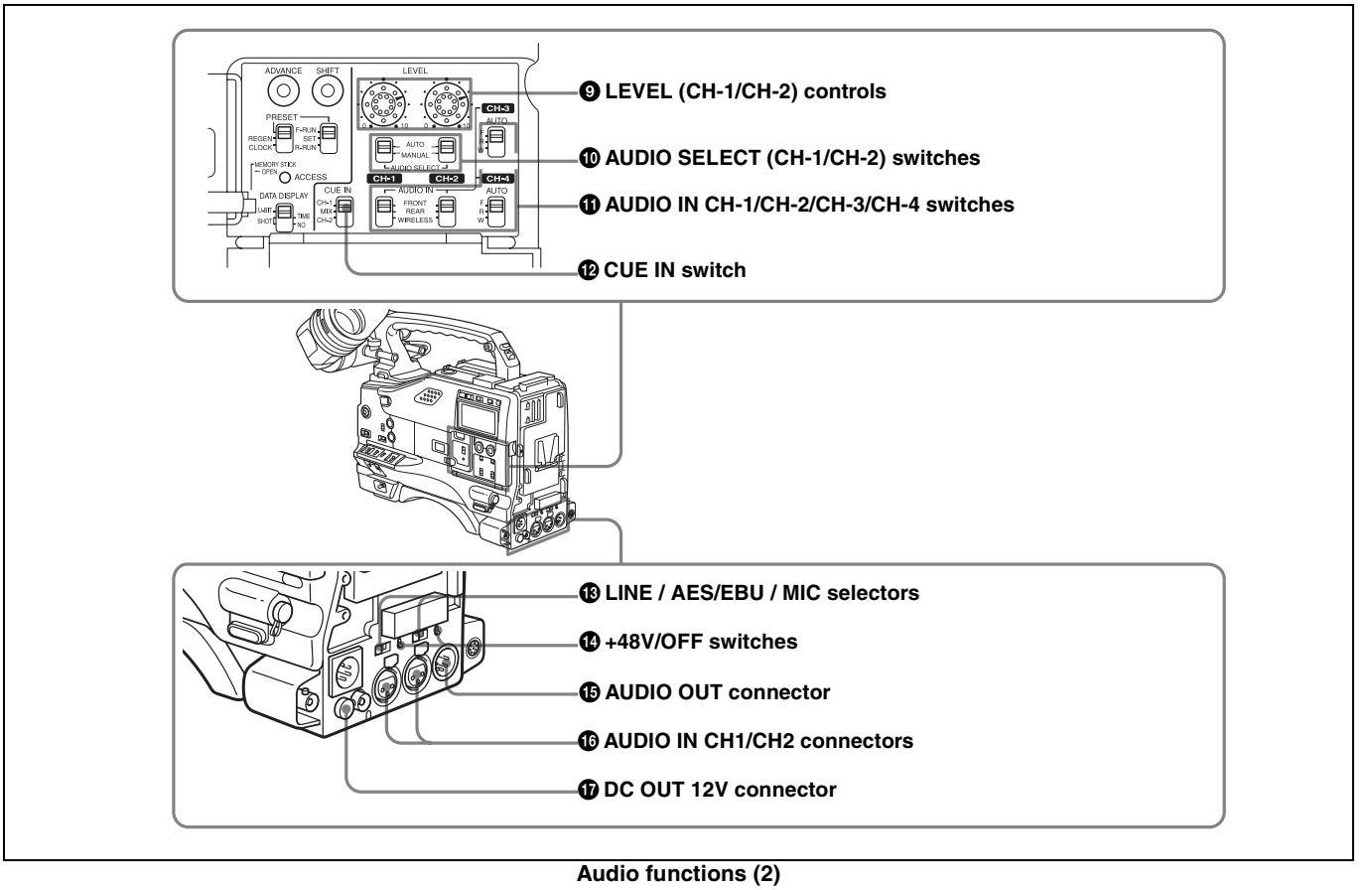
❻ MONITOR volume control
Adjusts the speaker or earphone volume for sounds other than the alarm sound. At the minimum position, no sound can be heard.

❼ ALARM volume control
Adjusts the speaker or earphone alarm volume. At the minimum position, no sound can be heard.



❽ Built-in speaker
The speaker can be used to monitor E-E sound during recording, and play back sound during playback. The speaker also sounds alarms to reinforce visual warnings. If you connect an earphone to the EARPHONE jack, the speaker is automatically muted.

See "8-4 Operation Warnings" on page 139 for information about alarms.


❾ LEVEL (CH-1/CH-2) controls
❿ AUDIO SELECT (CH-1/CH-2) switches
⓫ AUDIO IN CH-1/CH-2/CH-3/CH-4 switches
⓬ CUE IN switch
⓭ LINE / AES/EBU / MIC selectors
⓮ +48V/OFF switches
⓯ AUDIO OUT connector
⓰ AUDIO IN CH1/CH2 connectors
⓱ DC OUT 12V connector

Audio functions (2)

❾ LEVEL (CH-1/CH-2) (audio channel-1 and channel-2 recording level) controls
Adjust the audio levels of channels 1 and 2 when the AUDIO SELECT switches are set to MANUAL.

❿ AUDIO SELECT (CH-1/CH-2) (audio channel-1 and channel-2 adjustment method selection) switches
Select the audio level adjustment method for each of audio channels 1 and 2.
AUTO: Select this setting for automatic adjustment.
MANUAL: Select this setting for manual adjustment.

⓫ AUDIO IN CH-1/CH-2 / CH-3/CH-4 (audio input selection) switches

CH-1/CH-2 switches

Select the audio input signals to be recorded on audio channels 1 and 2.

FRONT: The input signal source is the microphone connected to the MIC IN connector.

REAR: The input signal source is the audio equipment connected to the AUDIO IN CH1/CH2 connectors.

WIRELESS: The input signal source is an optional WRR-855A/855B UHF Synthesized Tuner Unit.

CH-3/CH-4 switches

Select the audio input signals to be recorded on audio channels 3 and 4.

F (front): The input signal source is the microphone connected to the MIC IN connector.

R (rear): The input signal source is the audio equipment connected to the AUDIO IN CH1/CH2 connectors.

W (wireless): The input signal source is an optional WRR-855A/855B UHF Synthesized Tuner Unit.

⓬ CUE IN (cue track input) switch

Selects the input signal to be recorded on the cue track.

CH-1: Signal selected by the AUDIO IN CH-1 switch

MIX: Mixed signals selected by the AUDIO IN CH-1 and CH-2 switches

CH-2: Signal selected by the AUDIO IN CH-2 switch

Note

When recording mixed signals by setting this switch to MIX, be sure to confirm that the emphasis settings of the two channels (on/off) are the same. If they are different, the camcorder cannot record or play back mixed signals correctly.

When the AES/EBU format audio signal is selected, the emphasis settings are determined by the channel status of the AES/EBU format audio signal (emphasis bit).

When an audio signal other than the AES/EBU format audio signal is selected, the emphasis setting depends on the setting of AU REC EMPHASIS *(page 159)* on the AUDIO-2 page of the MAINTENANCE menu.

⓭ LINE / AES/EBU / MIC selectors

Select the audio source of the audio input signals input to the AUDIO IN CH1/CH2 connectors.

LINE: Line input audio equipment

AES/EBU: AES/EBU format audio signal

MIC: Microphone input

Note

If this selector is set to the MIC position and the +48V/OFF switch is set to +48V, and if you inadvertently connect any audio device other than a microphone to the AUDIO IN CH1/CH2 connectors, the device may be damaged.

⓮ +48V/OFF switches

Select either of the following positions for the microphones to be connected.

+48V: For a microphone to use an external power supply

OFF: For a microphone to use an internal power supply

⓯ AUDIO OUT (audio output) connector (XLR type, 5-pin, male)

Outputs the audio signals recorded on audio channels 1 and 2 or audio channels 3 and 4.

The MONITOR switch and CH-1/2 / CH-3/4 switches allow you to select the audio signal to be monitored.

When this connector is not being used, attach the supplied XLR connector cover onto it.

⓰ AUDIO IN CH1/CH2 (audio channel-1 and channel-2 input) connectors (XLR type, 3-pin, female)

These are audio input connectors for channels 1 and 2 to which you can connect audio equipment or a microphone.

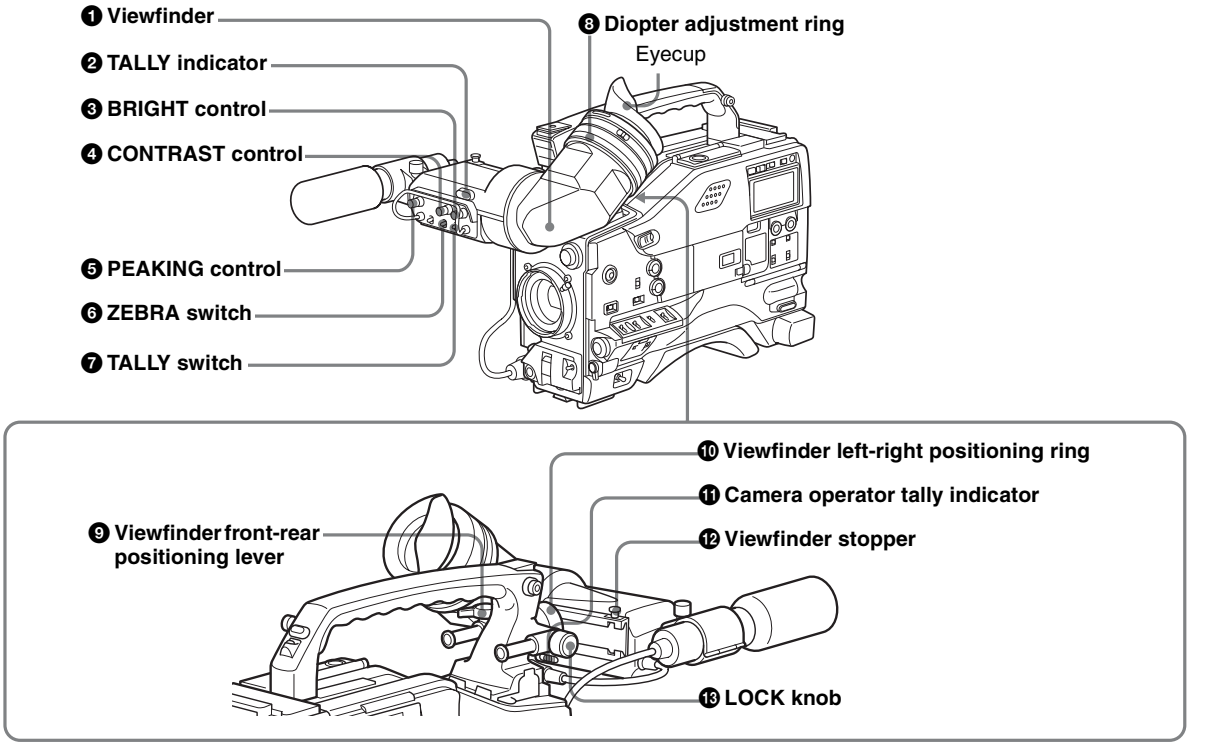
When the LINE / AES/EBU / MIC selector is set to AES/EBU, the CH1 connector is used for channel-1 and -2 inputs, and the CH2 connector, for channel-3 and -4 inputs.

When the connector is not being used, attach the supplied XLR connector cover onto it.

⓱ DC OUT 12 V (DC power output) connector (4-pin, female)

Supplies power for an optional WRR-861A/861B/862A/862B UHF Portable Tuner. Do not connect any equipment other than the UHF portable tuner.

2-4 Shooting and Recording/Playback Functions



Shooting and recording/playback functions (1)

❶ Viewfinder (when an optional HDVF-20A is used)

Lets you view the image in black and white while shooting, recording or playing back. It also displays various warnings and messages related to the settings or operating conditions of the camcorder, a zebra pattern, safety zone marker [1], and center marker [2].

1) The safety zone marker is a rectangle indicating the effective picture area.
2) The center marker indicates the center of the picture with a crosshair.

For details, see "5-2-5 Setting Marker Display" on page 87.

❷ TALLY indicator

Setting the TALLY switch to HIGH or LOW enables this indicator. The indicator lights during recording on the VTR. Like the REC indicator in the viewfinder, it flashes to indicate a problem. You can set the indicator brightness with the TALLY switch.

❸ BRIGHT (brightness) control

Adjusts the picture brightness on the viewfinder screen. It has no effect on the camera output signal.

❹ CONTRAST control

Adjusts the picture contrast on the viewfinder screen. It has no effect on the camera output signal.

❺ PEAKING control

Adjusts the sharpness of the picture on the viewfinder screen to make focusing easier. It has no effect on the camera output signal.

❻ ZEBRA switch

Controls the zebra pattern[1] on the viewfinder screen.
ON: The zebra pattern is displayed and stays.
OFF: No zebra pattern is displayed.
MOMENT: The zebra pattern is displayed and stays for 5 to 6 seconds.
The zebra pattern is factory set to indicate picture areas where the video level is approximately 70%. You can use the setup menu to change the setting so that areas where the video level is 100% and above are also displayed at the same time.

1) The zebra pattern is picture areas where the video level is approximately 70 % and 100 % or more. It is used as a guide when adjusting the iris manually.

For information about how to change the zebra pattern setting in the setup menu, see "5-2-6 Setting the Viewfinder" on page 88.

You can assign the function of the ZEBRA switch to the ASSIGN 1 switch, ASSIGN 2 switch, or TURBO GAIN button on the FUNCTION 1 page of the USER menu.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

❼ TALLY switch
Controls the TALLY indicator, setting its brightness (HIGH or LOW) or turning it off.
HIGH: The TALLY indicator brightness is high.
OFF: The TALLY indicator is off.
LOW: The TALLY indicator brightness is low.

❽ Diopter adjustment ring
Adjusts the viewfinder image for your vision.

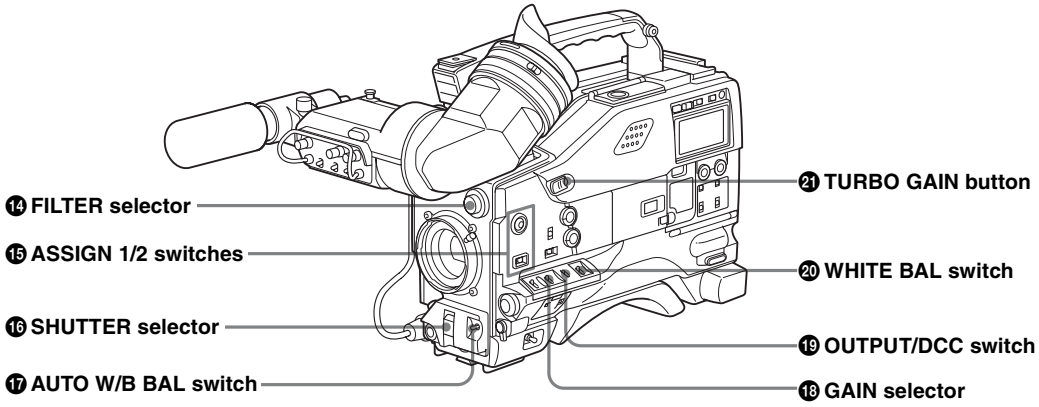
❾ Viewfinder front-rear positioning lever
To adjust the viewfinder position in the front-rear direction, loosen this lever and the LOCK knob. After adjustment, retighten this lever and the LOCK knob.

❿ Viewfinder left-right positioning ring
Loosen this ring to move the viewfinder sideways.

⓫ Camera operator tally indicator
Lights while the camcorder is recording.
Slide the window open when you shoot with your eye away from the viewfinder. This indicator flashes when the battery level is running low or the tape is almost full.

⓬ Viewfinder stopper
Pull up this stopper to detach the viewfinder from the camera.

⓭ LOCK knob
To adjust the viewfinder position in the front-rear direction, loosen this knob and the viewfinder front-rear positioning lever. After adjustment, retighten this knob and the viewfinder front-rear positioning lever.



Shooting and recording/playback functions (2)

⓮ FILTER selector
Selects the most appropriate filter to match the light source illuminating the subject.
When this selector is used with the display mode set to 3, the new setting appears on the viewfinder screen for about 3 seconds. (e.g.: ND: 1, CC: B)
The relationships between the selector settings and filter selections as well as examples of filters for different shooting conditions are as follows:

FILTER selector (outer knob) setting and CC filter selection

FILTER selector (outer knob) setting	CC filter selection
A	Cross filter [1)]
B	3200K
C	4300K
D	6300K

1) A special effect filter. Creates a 4-point star effect on highlighted area.

FILTER selector (inner knob) setting and ND filter selection

FILTER selector (inner knob) setting	ND filter selection
1	Clear
2	1/4 ND
3	1/16 ND
4	1/64 ND

Examples of shooting conditions and appropriate filters

Shooting condition	CC filter	ND filter
Sunrise and sunset; inside studio	B (3200K)	1 (clear)
Clear skies	C (4300K) or D (6300K)	2 (1/4 ND) or 3 (1/16 ND)
Cloudy or raining	D (6300K)	1 (clear) or 2 (1/4 ND)
Very bright conditions such as snow, at high altitudes, or at the seashore	C (4300K) or D (6300K)	3 (1/16 ND) or 4 (1/64 ND)

⓯ ASSIGN 1/2 switches

You can assign the desired functions to each of the ASSIGN 1 switch (push button) and ASSIGN 2 switch (sliding) on the FUNCTION 1 page of the USER menu.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

⓰ SHUTTER selector

Set this selector to ON to use the electronic shutter. Push it down to SELECT to switch the shutter speed or mode setting within the range previously set with the setup menu.

When this selector is operated, the new setting appears on the viewfinder screen for about 3 seconds.

For details about the shutter speed and mode settings, see "4-2 Setting the Electronic Shutter" on page 62.

⓱ AUTO W/B BAL (automatic white/black balance adjustment) switch

Activates the white balance and black balance automatic adjustment functions.

WHT: Automatic adjustment of the white balance. If the WHITE BAL switch is set to A or B, the white balance setting is stored in the corresponding memory. The memory stores a separate white balance setting for each filter setting.

BLK: Automatic adjustment of the black set and black balance.

⓲ GAIN selector

Switches the gain of the video amplifier to match the lighting conditions during shooting. The gains corresponding to the L, M, and H settings can be selected from the setup menu. The factory settings are L = 0 dB, M = 6 dB, and H = 12 dB.

When this selector is adjusted, the new setting appears on the viewfinder screen for about 3 seconds.

For details about setting the gain values, see "5-3-1 Setting Gain Values for the GAIN Selector Positions" on page 93.

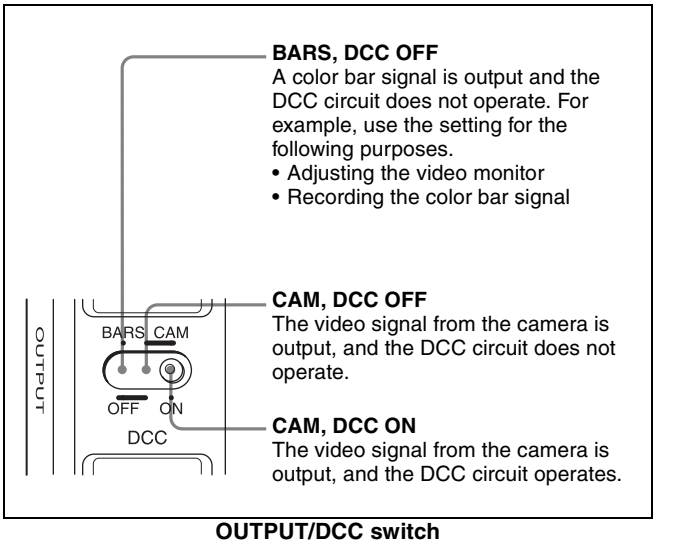
⓳ OUTPUT/DCC (output signal/dynamic contrast control) switch

Switches the video signal that is output to the VTR, viewfinder, and video monitor, between the following:

BARS: Outputs the color bar signal.

CAM: Outputs the video signal from the camera. When this is selected, you can switch DCC[1)] on and off with this selector.

1) DCC (Dynamic Contrast Control)
Against a very bright background with the iris opening adjusted to the subject, objects in the background will be lost in the glare. The DCC function will suppress the high intensity and restore much of the lost detail and is particularly effective in the following cases.
•Shooting people in the shade on a sunny day
•Shooting a subject indoors, against a background through a window
•Any high contrast scene


BARS, DCC OFF
A color bar signal is output and the DCC circuit does not operate. For example, use the setting for the following purposes.
• Adjusting the video monitor
• Recording the color bar signal
CAM, DCC OFF
The video signal from the camera is output, and the DCC circuit does not operate.
CAM, DCC ON
The video signal from the camera is output, and the DCC circuit operates.
OUTPUT
BARS CAM
OFF ON
DCC

OUTPUT/DCC switch

⓴ WHITE BAL (white balance memory) switch

Controls the white balance setting.

PRST (preset): Adjusts the color temperature corresponding to the position of the FILTER selector. Use the PRST setting when you have no time to adjust the white balance.

A or B: When the AUTO W/B BAL switch is pushed to WHT, the white balance is automatically adjusted according to the current position of the FILTER selector, and the adjusted value is stored in either memory A or memory B. (There are two memories for each filter, allowing a total of eight adjustments to be stored.) When this switch is set to A or B, the camcorder automatically adjusts itself to the stored value corresponding to the current settings of this switch and the FILTER selector.

You can use the AUTO W/B BAL switch even when ATW[1)] is in use.

1) ATW (Auto Tracing White Balance)
The white balance of the picture being shot is adjusted automatically for varying lighting conditions.

B (ATW): When this switch is set to B and on the FUNCTION 2 page of the OPERATION menu, WHITE SWITCH<B> *(page 146)* is set to ATW, ATW is activated.

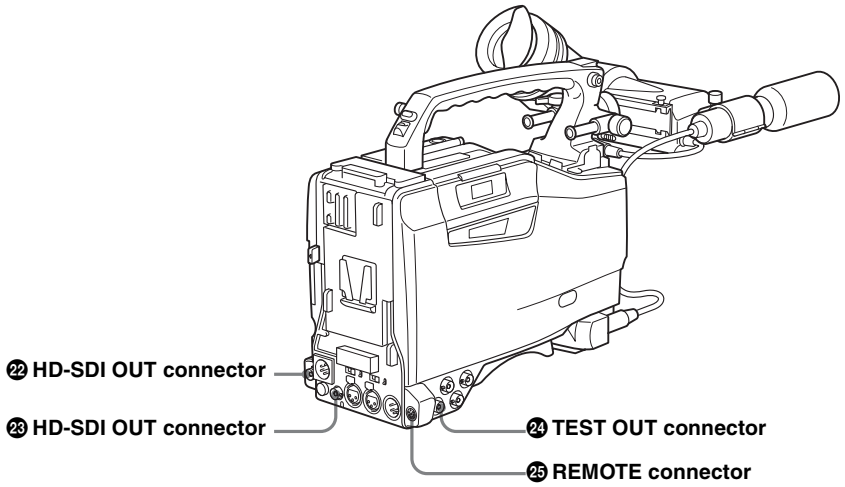
When this switch is adjusted, the new setting appears on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds.
You can assign the ATW ON/OFF function to the ASSIGN 1 switch (push button) on the FUNCTION 1 page of the USER menu.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

㉑ TURBO GAIN button

When shooting under extremely poor lighting conditions, press the button once to boost the video gain to the value preset on the GAIN SW page of the USER menu (up to 42 dB). To stop boosting the gain, press the button once more. The gain is reset to the original gain. You can assign the desired function to this TURBO GAIN button like the ASSIGN 1 switch on the FUNCTION 1 page of the USER menu.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.



Shooting and recording/playback functions (3)

㉒ HD-SDI OUT connector (BNC type)
㉓ HD-SDI OUT connector (BNC type)

Output an HD-SDI signal for a video monitor. You can select whether or not the signal is output from these connectors using the OUTPUT SEL page of the USER menu.
When an optional HKDW-702 extension board is attached to the camcorder, the camcorder outputs either a down-converted analog composite signal (color) or an SD SDI signal from the HD-SDI OUT connector located on the side. You can select which signal is output on the OUTPUT SEL page of the USER menu.

For details on how to select the output signal, see "5-3-2 Selecting Output Signals" on page 94.

㉔ TEST OUT (test output) connector (BNC type)

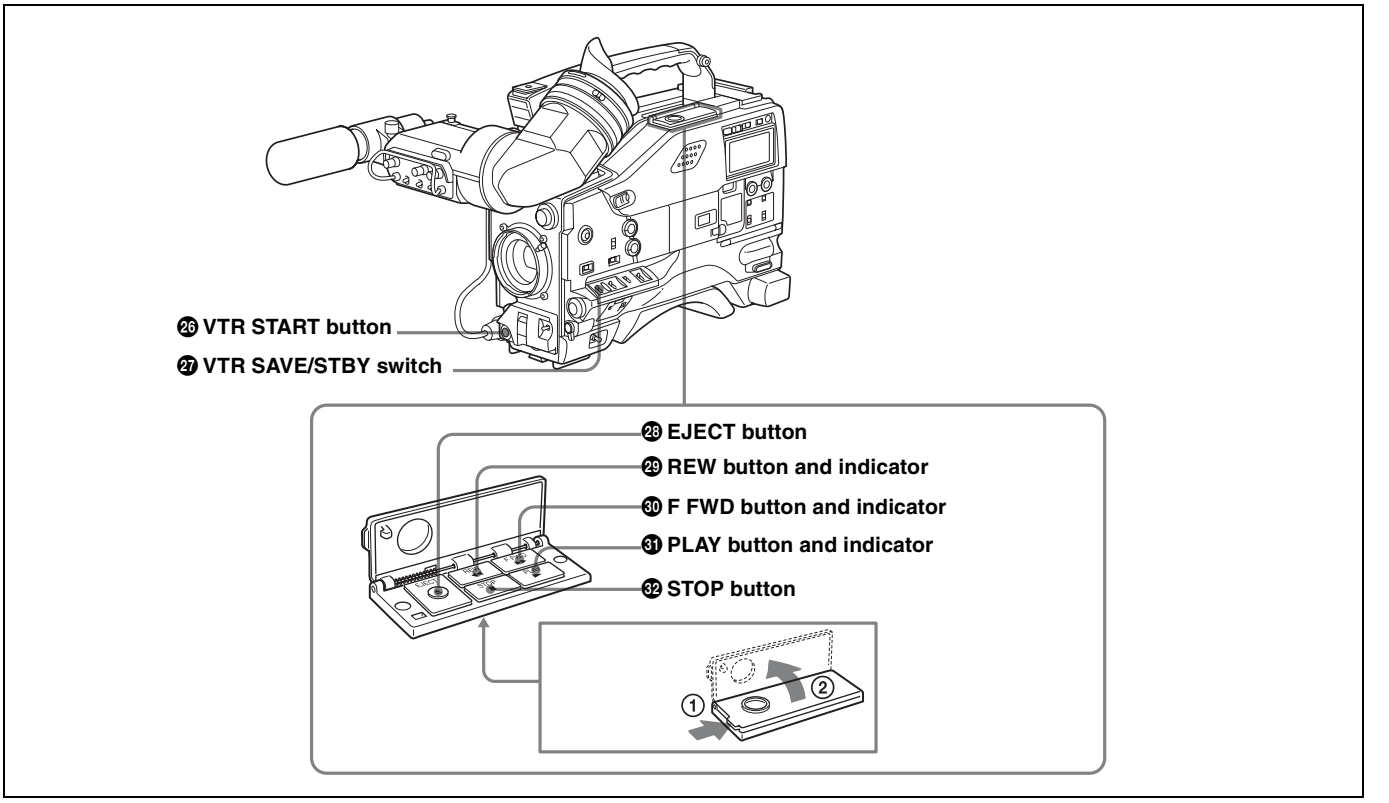
Outputs an HD-Y (standard level, 75-ohm terminated) signal for the video monitor.
When an optional HKDW-702 extension board is attached to the camcorder, you can select either a down-converted analog composite signal (color) or an HD-Y signal on the OUTPUT SEL page of the USER menu.

For details on how to select the output signal, see "5-3-2 Selecting Output Signals" on page 94.

Depending on menu settings, menus, time code, and shot data can be superimposed on the image on the monitor.

㉕ REMOTE connector (8-pin)

Connect the RM-B150/B750 Remote Control Unit, which makes it possible to control the VTR and camera remotely.



Shooting and recording/playback functions (4)

㉖ VTR START button

Press this button to start recording. Press it again to stop recording. The effect is exactly the same as that of the VTR button on the lens.

When the REC SWITCH function is assigned to the ASSIGN 1 switch (push button), you can use the switch as the VTR START button.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

㉗ VTR SAVE/STBY (standby) switch

Controls the VTR power mode during pauses in recording.

SAVE: Power saving mode. When you press the VTR START button, there is a short delay before recording starts, but power consumption in this mode is less than in standby mode. As a result, battery life is extended. When the switch is set to SAVE, the VTR SAVE indicator in the viewfinder lights.

STBY: Standby mode. Recording starts as soon as you press the VTR START button.

Notes

- Avoid allowing the camcorder to remain in STBY (standby) mode for a long time.
- Even if the switch is set to the STBY position, the camcorder can automatically turn to power saving mode if the tape does not run for a certain period. In such a case, the VTR SAVE indicator in the viewfinder lights. This function is effective when a setting other than OFF is selected for the STBY OFF TIMER item on the VTR MODE page of the MAINTENANCE menu. The STBY OFF TIMER item also allows you to select the length of time until the camcorder turns to power saving mode.

For detailed information, see "3-6 Setting the Stand-by off Timer During Rec-Pause" on page 58.

㉘ EJECT button

Press this button to eject or load a cassette.

㉙ REW (rewind) button and indicator

Press this button to rewind the tape. The indicator lights during rewinding.

㉚ F FWD (fast forward) button and indicator

Press this button to fast forward the tape. The indicator lights during fast forward.

㉛ PLAY button and indicator

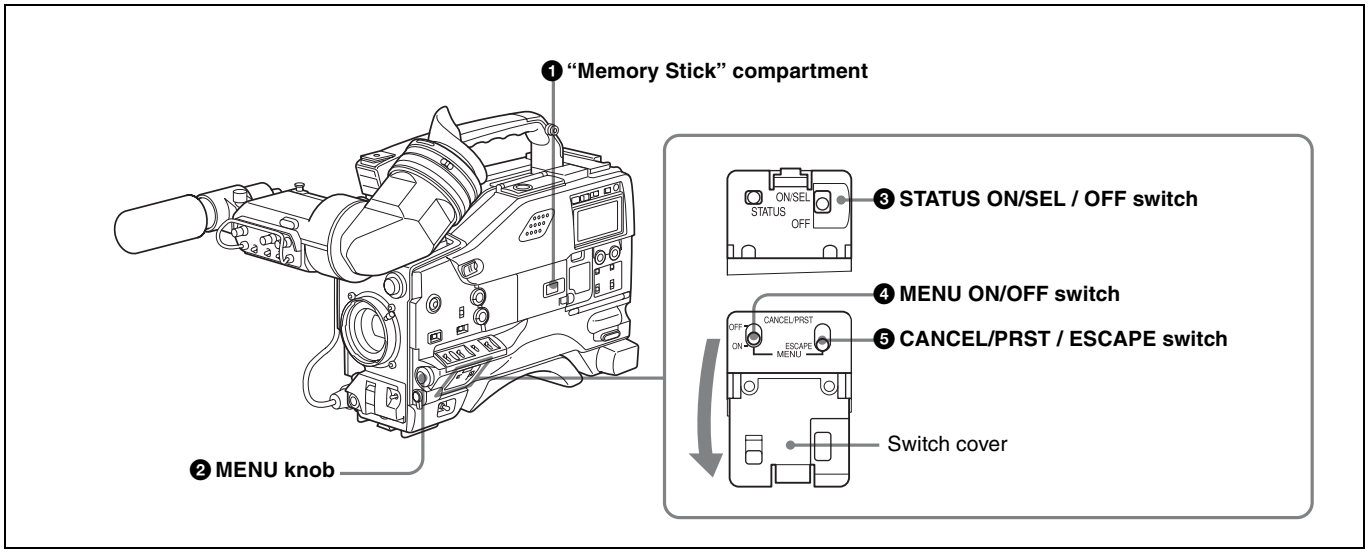
Press this button to view the recorded picture in the viewfinder or on the color video monitor. The indicator lights during playback.

The four times normal speed search function is provided to make it far quicker to find a desired location of the tape. Press the REW button or F FWD button during playback to view the four times normal speed search picture.

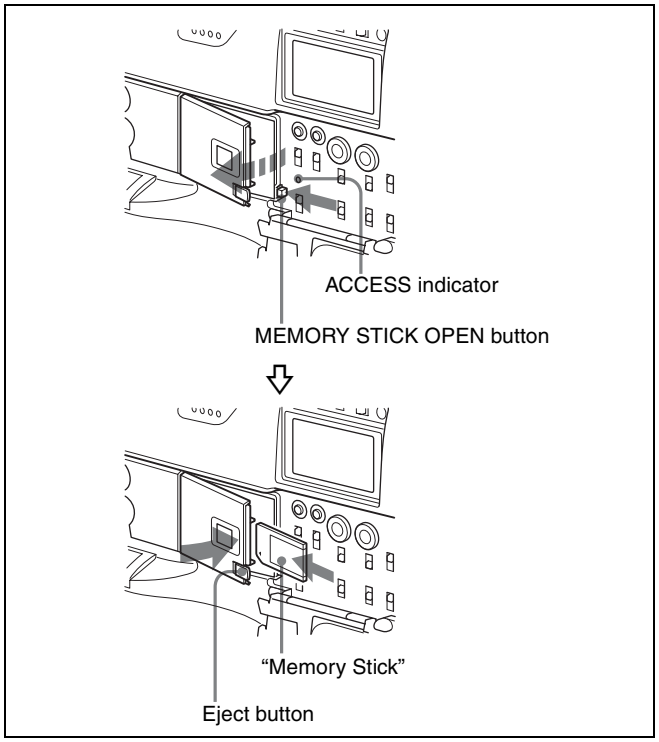
㉜ STOP button

Press this button to stop the tape.

2-5 Menu Operating Section



❶ "Memory Stick" compartment



Open the cover of the "Memory Stick" compartment by pressing the MEMORY STICK OPEN button and insert the "Memory Stick."
To remove, press the eject button.
During data writing/loading to/from the "Memory Stick," the ACCESS indicator lights or flashes.

For details, see "6-1-1 Handling the "Memory Stick"" on page 108.

❷ MENU knob

Changes the page selection or a setting within the menu.

Push: If you push this knob when the arrow (➧) is placed at the page title on the menu, the arrow changes to a question mark (?) and you can change the page by turning this knob.
When the arrow mark is placed at a position other than the page title, you can change the setting of the current item by pushing and turning this knob.

Turn: Turn this knob to change the page or change item settings.

❸ STATUS ON/SEL / OFF (menu display on/page selection/display off) switch

To enable this switch, set the MENU ON/OFF switch to OFF.
Closing the switch cover automatically sets the MENU ON/OFF switch to OFF.

ON/SEL: Each time this switch is pushed upward, a window to confirm the menu settings and status of the camcorder appears on the viewfinder screen. The window consists of three pages, which are switched each time the switch is pushed upward. Each page is displayed for about 10 seconds.

OFF: To clear the page immediately after display, push this switch down to the OFF position.

You can select the pages to be displayed on the menu.

For details, see "5-2-9 Displaying the Status Confirmation Windows" on page 91.

❹ MENU ON/OFF switch

To use this switch, open the switch cover.
This switch is used to display the menu on the viewfinder screen or the test signal screen.

Closing the cover automatically sets this switch to OFF.

ON: Displays the menu on the viewfinder screen or the test signal screen, at the last accessed page. When the menu is used for the first time, the first page is displayed.

OFF: Removes the menu from the viewfinder screen or the test signal screen.

❺ CANCEL/PRST (preset) / ESCAPE switch

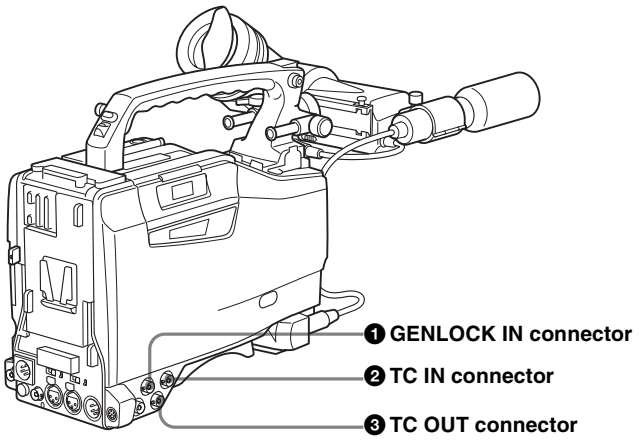
To enable this switch, set the MENU ON/OFF switch to ON.

Closing the cover automatically sets the MENU ON/OFF switch to OFF.

CANCEL/PRST: Pushing this switch up to this position displays the message to confirm whether the previous settings are cancelled or settings are reset to their initial values, depending on the menu operating condition. Pushing this switch up to this position again cancels the previous settings or resets the settings to their initial values.

ESCAPE: Use this switch when the menu page, which has a hierarchical structure, is opened. Each time the switch is pushed to this position, the page returns to one stage higher in the hierarchy.

2-6 Time Code System



Time code functions (1)

❶ GENLOCK IN connector (BNC type)

- This connector inputs an HD reference signal when the camera is to be genlocked or when the time code is to be synchronized with external equipment.
- When the time code is to be synchronized with external equipment, this connector can input an NTSC/PAL analog composite signal as the reference video signal.
- This connector also inputs a return video signal. You can display the image of the return video signal on the viewfinder screen when you set RETURN VIDEO to ON on the GENLOCK page of the MAINTENANCE menu.
  You can assign the RETURN VIDEO function to the ASSIGN 1 switch.

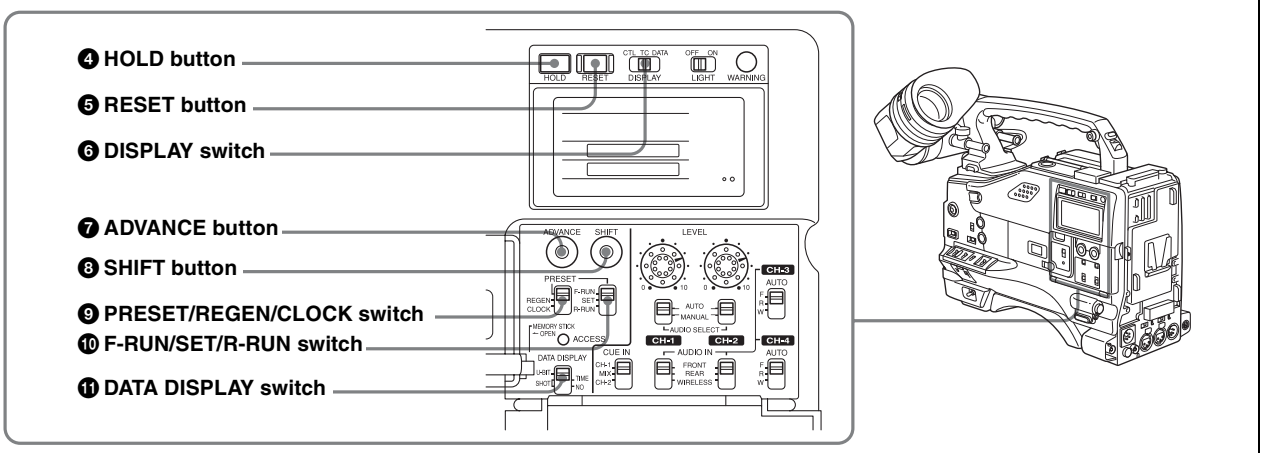
For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

❷ TC IN (time code input) connector (BNC type)

To synchronize the time code of this camcorder to an external time code, input the reference time code to this connector.

❸ TC OUT (time code output) connector (BNC type)

To synchronize the time code of an external VTR to that of the camcorder, connect this connector to the reference time code input connector of the external VTR.



Time code functions (2)

❹ HOLD (display hold) button

Pressing this button instantly freezes the time data displayed in the counter display section. (The time code generator continues running.) Pressing this button again releases the hold. You can use this button, for example, to determine the exact time of a particular shot.
When the HOLD button is activated, the time data is displayed in the following format:

00:00:00:00

For details of the counter display, see "2-8 Warnings and Indications on the Display Panel" on page 32.

❺ RESET button

Pressing this button resets the time data displayed on the counter display section to "00:00:00:00" or the user bit data to "00000000."

❻ DISPLAY (LCD display) switch

CTL: Displays control signal
TC: Displays time code
DATA: Displays the item selected by the DATA DISPLAY switch.

For details, see "Time code display" on page 33.

❼ ADVANCE button

For setting the time code, user bits, or real time, each press of this button increments the flashing digit selected by the SHIFT button.

❽ SHIFT button

For setting the time code, user bits, or real time, this button selects the digit to be changed. The selected digit flashes.

❾ PRESET/REGEN (regeneration)/CLOCK switch

This switch selects whether to set a new time code or to follow the already recorded time code.

PRESET: Records time code with a preset initial value.
REGEN: Records time code continuous with the existing time code recorded on the tape. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in R-RUN mode.
CLOCK: Records time code synchronized to the internal clock. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in F-RUN mode.

For more information, see "To make the time code consecutive" on page 72.

❿ F-RUN/SET/R-RUN (free run/set/recording run) switch

This switch selects the operating mode for the internal time code generator.
F-RUN: Time code keeps advancing, regardless of the operating state of the VTR. Use this setting when aligning the time code with real time or when synchronizing the time code with an external time code.
SET: Set the switch to this position to set the time code or user bits.
R-RUN: The time code value advances only during recording. Use this setting to have a consecutive time code on the tape.

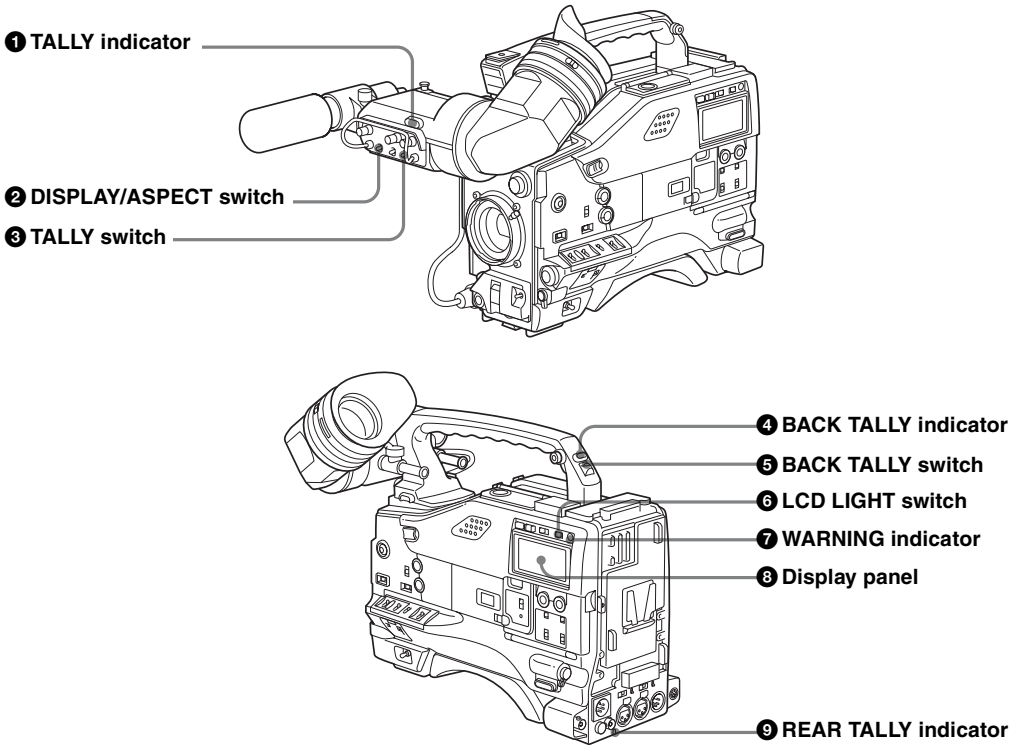
For details, see "4-5-1 Setting the Time Code" on page 71 and "4-5-3 Setting the User Bits" on page 72.

⓫ DATA DISPLAY switch

U-BIT: Displays the user bit value
SHOT TIME: Displays the date and time from the shot data
SHOT-NO: Not used

2-7 Warnings and Indications

Besides the viewfinder, speaker and earphones, the indicators and displays described in this section also provide you with information such as the operating state of the camcorder and warnings.



❶ TALLY indicator

Setting the TALLY switch on the viewfinder to HIGH or LOW enables this indicator. It lights when the VTR starts recording. Like the REC indicator in the viewfinder, it also flashes to provide warnings. The brightness of this indicator when it is lit can be switched with the TALLY switch.

❷ DISPLAY/ASPECT (display/aspect control) switch

Turns the markers on or off and changes the viewfinder screen aspect ratio.

DISPLAY: When the MARKER is set to ON on the MARKER 1 page of the USER menu, pushing this switch to DISPLAY toggles the markers on the viewfinder screen on and off.

ASPECT: Pushing this switch to ASPECT toggles the viewfinder screen aspect ratio between 16 : 9 and 4 : 3.

For details, see "5-2-5 Setting Marker Display" on page 87.

Note

Setting the MENU ON/OFF switch to ON displays the menu on the viewfinder screen even if the DISPLAY switch is set to OFF.

❸ TALLY switch

Controls the TALLY indicator as follows:

HIGH: The TALLY indicator brightness is high.

OFF: The TALLY indicator is off.

LOW: The TALLY indicator brightness is low.

❹ BACK TALLY indicator

When the BACK TALLY switch is set to ON, this indicator has the same function as the TALLY indicator.

❺ BACK TALLY switch

Enables or disables the BACK TALLY and REAR TALLY indicators.

ON: The BACK TALLY and REAR TALLY indicators are enabled.

OFF: The BACK TALLY and REAR TALLY indicators are disabled.

❻ LCD LIGHT switch
Turns on/off the display panel light.

❼ WARNING indicator
Lights up or flashes when there is a fault in the VTR.

For details, see "8-4 Operation Warnings" on page 139.

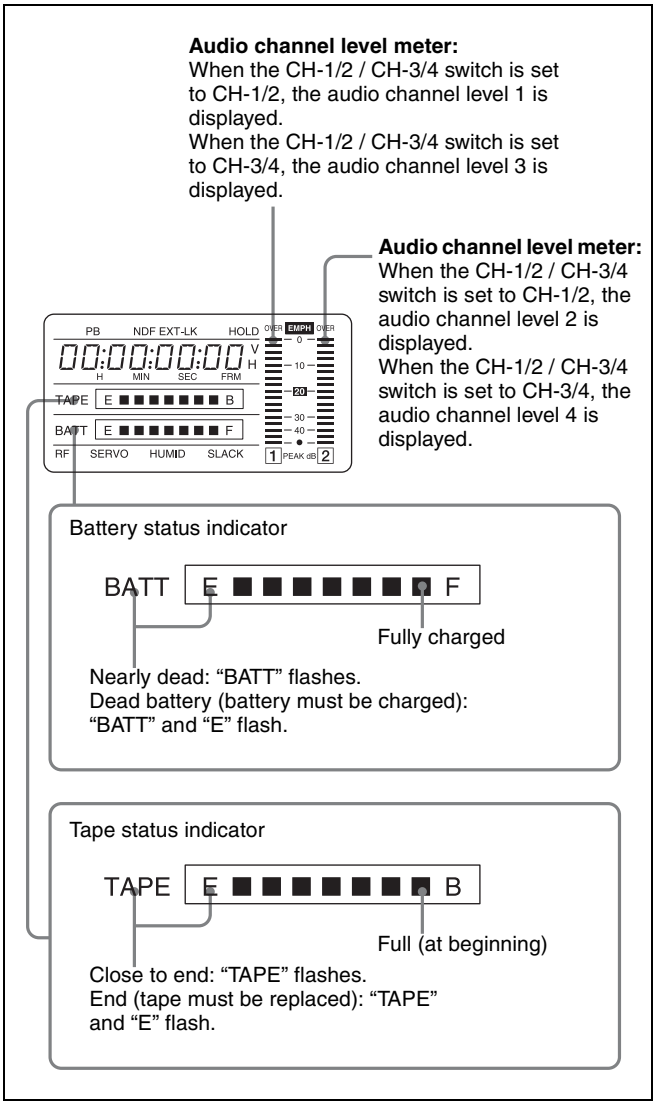
❽ Display panel
Displays VTR-related warnings, battery status, tape status, audio levels, time data, and so on.

For details, see "2-8 Warnings and Indications on the Display Panel" on page 32.

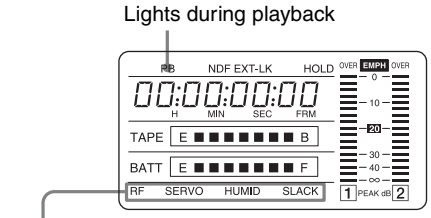
❾ REAR TALLY indicator
When the BACK TALLY switch is set to ON, this indicator has the same function as the BACK TALLY indicator.

2-8 Warnings and Indications on the Display Panel

Tape status, battery status and audio level


Audio channel level meter:
When the CH-1/2 / CH-3/4 switch is set to CH-1/2, the audio channel level 1 is displayed.
When the CH-1/2 / CH-3/4 switch is set to CH-3/4, the audio channel level 3 is displayed.
Audio channel level meter:
When the CH-1/2 / CH-3/4 switch is set to CH-1/2, the audio channel level 2 is displayed.
When the CH-1/2 / CH-3/4 switch is set to CH-3/4, the audio channel level 4 is displayed.
PB
NDF EXT-LK
HOLD
00:00:00:00
H MIN SEC FRM
TAPE E B
BATT E F
RF SERVO HUMID SLACK
EMPH
PEAK dB
Battery status indicator
BATT E F
Fully charged
Nearly dead: "BATT" flashes.
Dead battery (battery must be charged): "BATT" and "E" flash.
Tape status indicator
TAPE E B
Full (at beginning)
Close to end: "TAPE" flashes.
End (tape must be replaced): "TAPE" and "E" flash.

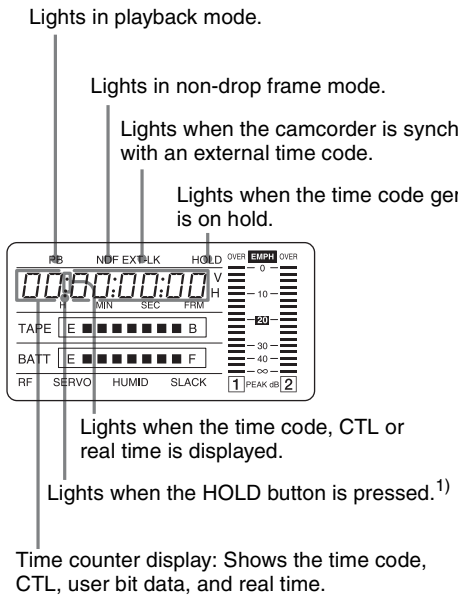
VTR operation status and status indicators



Warning indication
RF: Lights if the recording heads are clogged.
SERVO: Lights if the servo motor fails.
HUMID: Lights if condensation is on the drum.
SLACK: Lights if the tape is not winding properly.

For details, see "8-4 Operation Warnings" on page 139.

Time code display



1) When the HOLD button is pressed to hold the time code value, the time code is displayed in the format shown below. When the HOLD button is pressed again to release the hold, the time code is displayed in the normal format.

00:00:00:00

Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays

Except during setting of the time code, the time counter display is determined by the position of the DISPLAY switch and DATA DISPLAY switch.

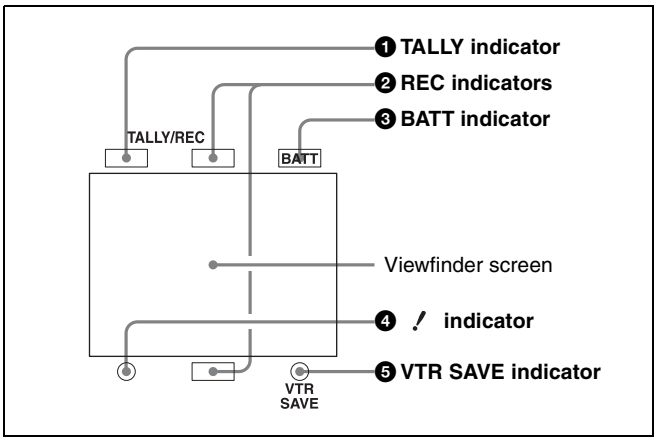
For details of setting the time code menu operation, see "4-5-1 Setting the Time Code" on page 71.

Switch settings related to time code and displayed information

DISPLAY switch position	DATA DISPLAY switch position	Displayed information
CTL	Any position	Control signal
TC	Any position	Time code
DATA	U-BIT	User bits
	SHOT TIME	Data and time from shot data
	SHOT-NO	Not used (currently zero is displayed.)

2-9 Indicators in the Viewfinder

Several indicators are provided above and below the viewfinder screen to indicate the current state and adjustments of the camera.



❶ TALLY (green tally) indicator

Lights in green when the camcorder is in Picture Cache mode.
Also, this indicator blinks in green when the camcorder is in auto Interval Rec mode or manual Interval Rec mode.
When HD SDI REMOTE I/F *(page 164)* is set to G-TLY on the FUNCTION 3 page of the MAINTENANCE menu, this indicator lights in green when the HDW-250/S280 connected to the HD-SDI OUT connector starts recording.

Note

When HD SDI REMOTE I/F *(page 164)* is set to G-TLY on the FUNCTION 3 page of the MAINTENANCE menu, this indicator does not light in green even in Picture Cache mode.

❷ REC (recording/red tally) indicators

Light in red during recording. They also warn by flashing.

For more information, see "8-4 Operation Warnings" on page 139.

When HD SDI REMOTE I/F *(page 164)* is set to R-TLY on the FUNCTION 3 page of the MAINTENANCE menu, this indicator lights in red while the HDW-250/S280 connected to the HD-SDI OUT connector is recording, even when a cassette is not loaded in the camcorder.

❸ BATT (battery) indicator

Starts flashing when power level of the battery connected to the camcorder has been reduced, and stays lit when the battery is exhausted.

To prevent interruption during operation, replace the battery as soon as this indicator starts flashing.
The level at which the indicator starts flashing can be set on the BATTERY page *(page 158)* of the MAINTENANCE menu.

❹ ! (warning) indicator

Lights up when the camcorder is used under one or more of the following conditions and if the corresponding items have been set to ON on the '!' LED page of the USER menu.

- The gain is set to anything but 0 dB.
- The SHUTTER selector is ON.
- The WHITE BAL switch is set to PRST.
- The 5600K mode is set to ON.
- ATW is being used.
- The lens extender is being used.
- The FILTER selector is set to anything but ND:1/CC:B.
- The reference value of the auto iris adjustment is anything but the standard value.

You can change the criteria for whether ! indicator lights or does not light on the '!' LED STD page of the USER menu.

For details, see "5-2-4 Selecting the Items for Which the '!' LED is to Light" on page 86.

❺ VTR SAVE indicator

Lights up when the VTR section is set to power save mode by setting the VTR SAVE/STBY switch to SAVE.

Recording and Playback Chapter 3

3-1 About Cassettes

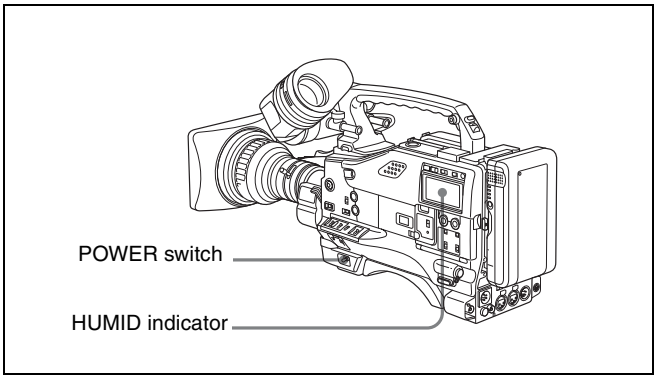
This section describes the procedure for loading and unloading a cassette.

See Specifications "VTR Section" on page 142 for information about the cassettes you can use in the camcorder.

3-1-1 Loading and Unloading a Cassette

Loading a cassette

1 Turn on the POWER switch.

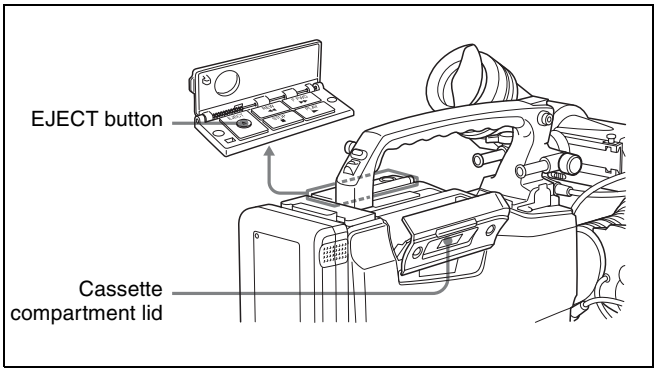


Note

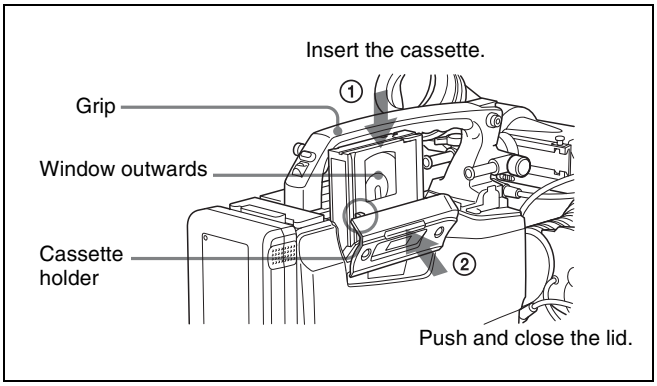
If the interior of the VTR section is damp, the HUMID indicator will light. If this happens, wait until the indicator goes off before going on to step **2**.

2 Press the EJECT button.

The cassette compartment lid will open.



3 Check that there is no slack in the tape. Then slide in the cassette until it clicks into position and close the cassette lid completely by pressing near the engraved PUSH.

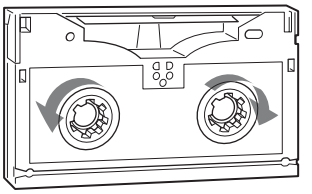


Notes

- To load the cassette correctly, insert the tape with the grip of the camcorder pointing upward as illustrated.
- When inserting the cassette, be careful that you don't hit the tape against the cassette holder.

Checking the tape for slack

Pressing in the reels lightly, turn them gently with your fingers in the directions shown below. If the reels will not move, there is no slack to adjust.



Unloading a cassette

With the power supply on, press the EJECT button to open the cassette compartment lid. Then take out the cassette. If you are not going to insert another cassette, close the cassette lid.

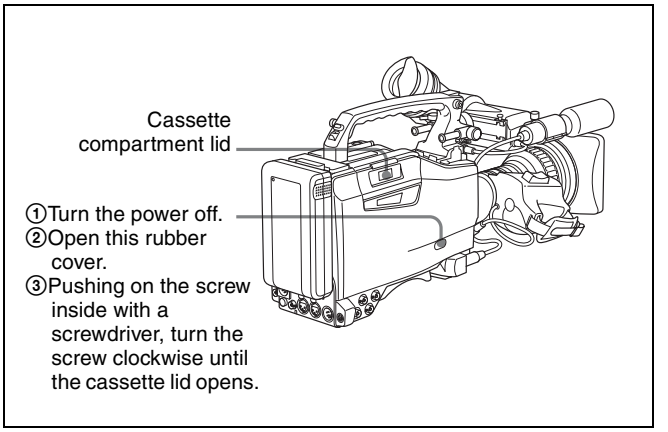
Even if the battery is exhausted and the VTR stops, it is possible to take out the cassette and close the cassette compartment lid if the remaining battery voltage is about 10.5 V or more. However, when the battery voltage is low, do not repeat the unloading operation. If you repeat the operation, the power may be turned off during the ejection operation and you may not be able to continue the operation.

Note

When you do not intend to use the camcorder for a long time, take out the cassette to protect the tape and turn off the power.

Unloading a cassette manually (manual eject)

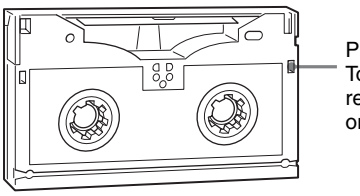
When you cannot unload a cassette even if you press the EJECT button, take out the cassette manually as illustrated below.


Cassette compartment lid
①Turn the power off.
②Open this rubber cover.
③Pushing on the screw inside with a screwdriver, turn the screw clockwise until the cassette lid opens.

You need not return the screw to its original position after taking out the cassette. Although the cassette compartment lid is not locked, turning on the power makes the cassette lid operable again.

3-1-2 Preventing Accidental Erasure

The following procedure prevents cassettes from being recorded inadvertently.



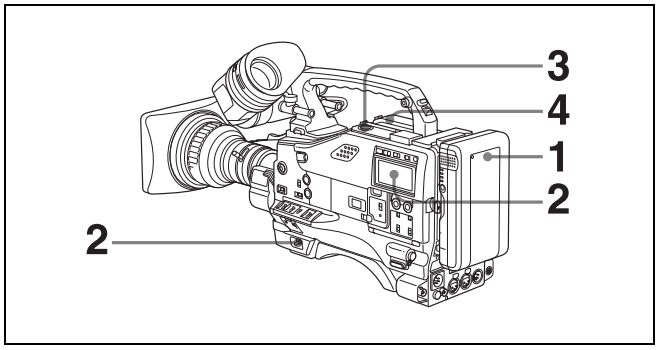
3-2 Recording

3-2-1 Basic Procedures

This section describes the basic procedures for shooting and recording.
Before a shooting session, ensure that the camcorder is functioning properly.

For details, see "8-1 Testing the Camcorder Before Shooting" on page 132.

From turning on the camcorder to loading a cassette



1 Attach a fully charged battery pack.

For details, see "7-1 Power Supply" on page 118.

2 Set the POWER switch to ON. Check that the HUMID indicator does not appear and that the battery power level is sufficient.

If HUMID indicator appears, wait until it disappears.

Note

After turning off the power, check whether the drum is dry (even if the HUMID indicator is off) with visual inspection when turning on the power again.

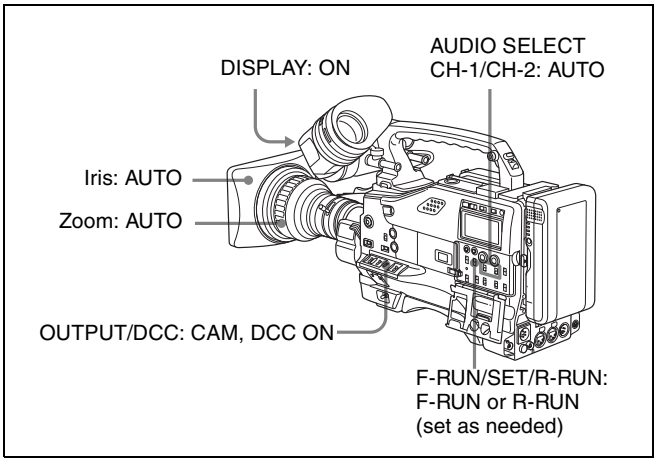
3 Check that there are no obstructions near the cassette lid. then push the EJECT button to open the cassette lid.

4 After checking the points below, load the cassette and close the cassette lid.

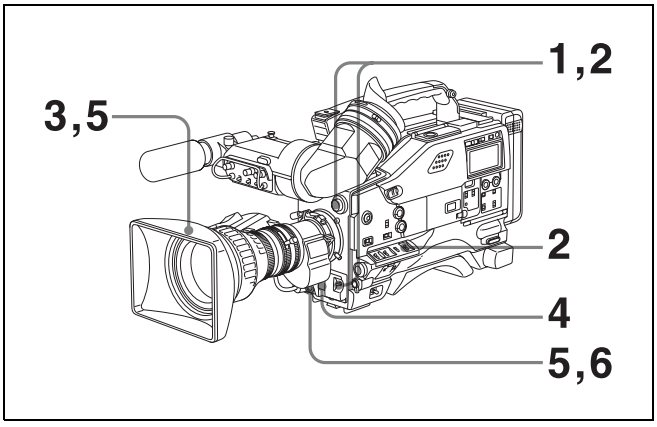
- The cassette is not write-protected.
- There is no slack in the tape.

From adjusting the black balance and white balance to stopping recording

After turning on the power and loading a cassette, set the switches and selectors as shown below and begin operation.



Shooting



1 Push the AUTO W/B BAL switch to BLK to adjust the black balance.

For details of black balance adjustment, see "4-1-1 Adjusting the Black Balance" on page 59.

2 Select the CC filter and ND filter to match the lighting conditions, and adjust the white balance.

When the white balance settings are already in memory

Set the WHITE BAL switch to A or B.

When the white balance setting is not in memory and you do not have enough time to adjust the white balance

Set the WHITE BAL switch to PRST.
This automatically adjusts the white balance as follows, depending on the setting of the FILTER selector.
A: Cross filter

B: 3200K
C: 4300K
D: 6300K

For details, see "4-1-2 Adjusting the White Balance" on page 60.

3 Aim the camera at the subject and adjust the focus and zoom.

4 If necessary, set the electronic shutter for an appropriate mode and speed.

For details, see "4-2 Setting the Electronic Shutter" on page 62.

5 To start recording, press the VTR START button or the VTR button on the lens.

If the recording start/stop function is assigned to the ASSIGN 1 switch, this switch functions as VTR START button.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

During recording, the REC indicator lights in the viewfinder. Perform zooming and focus control, if necessary.

6 To stop recording, press the VTR START button or the VTR button on the lens again.

The REC indicator in the viewfinder goes off.

Cassette control buttons

During recording, the cassette control buttons (EJECT, REW, F FWD, PLAY, STOP) have no effect.

Note

When crash-recording without doing continuous recording on a recorded tape, or when recording with the RE-TAKE function, the timecode recorded previously may be displayed for a few seconds when playing back the first part of the cut.

3-2-2 Continuous Recording

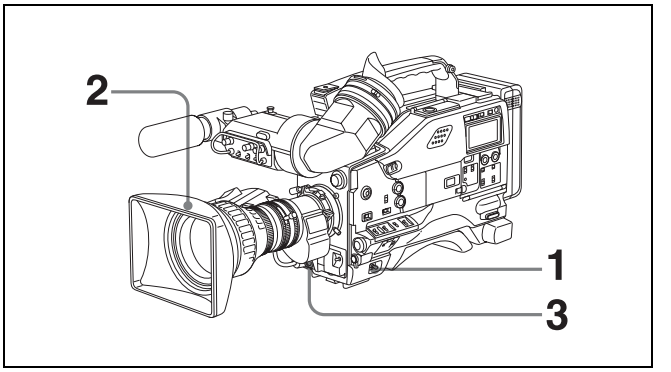
If the camcorder is in the recording pause mode, simply pressing the VTR START button on the camcorder or the VTR button on the lens continues recording exactly from the next frame.
In other cases, you first need to position the tape at an appropriate point.

When the camcorder is in Recording Pause mode

Pressing the VTR START button on the camcorder or the VTR button on the lens continues recording at exactly the next frame. However, the time taken before recording starts depends on the setting of the VTR SAVE/STBY switch.

- If the VTR SAVE/STBY switch is in the SAVE position, it takes about 4 seconds before recording starts.
- If the VTR SAVE/STBY switch is in the STBY position, recording starts immediately. However, just after the switch position is changed from SAVE to STBY, it takes about 4 seconds before recording starts.

If you turn off the power during a recording pause



1 Turn on the power again.

2 Press the RET button on the lens.

If an analog composite signal is input to the GENLOCK IN connector, make sure that RETURN VIDEO *(page 164)* is set to OFF on the GENLOCK page of the MAINTENANCE menu.

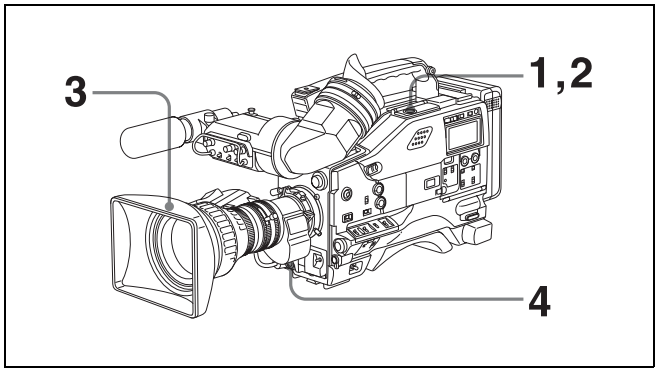
The camcorder positions the tape at the appropriate point. Note, however, that this function works only for continuously recorded material or consecutively joined segments totaling at least 3 seconds in length.

3 Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

Continuous recording in other cases

After rewinding or fast forwarding, after removing the cassette, or on a tape that has been partially recorded, you can obtain a continuous recording by following the procedure below.
The End Search function also allows you to continue recording on a partially recorded tape.

For details, see "3-2-8 Searching for the Last Recorded Portion and Turning on Recording Pause Mode (End Search Function)" on page 51.



1 Looking in the viewfinder, press the PLAY button to start playback.

2 Press the STOP button at the desired point to begin recording. To continue from the end of a recording already on the tape, press the STOP button immediately after the end of the previously recorded segment (within 0.5 seconds).

3 Press the RET button.

The tape will rewind and will be positioned at the desired point to continue recording.

4 Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

3-2-3 Recording Good Shot Marks

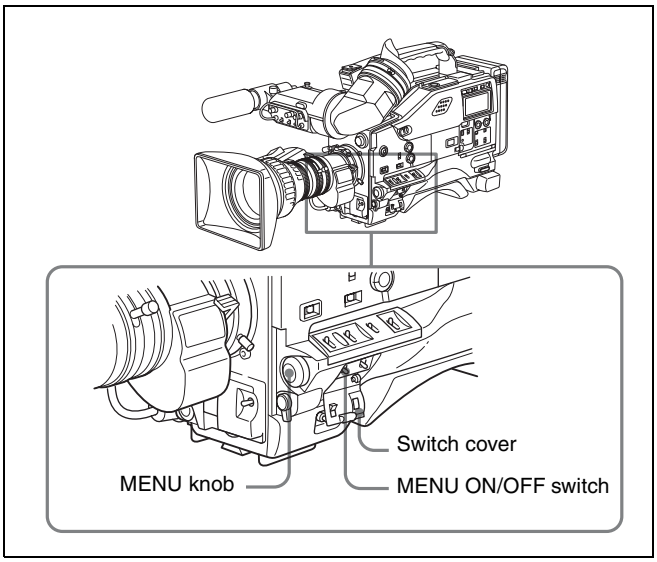
Good shot marks 1 and 2 are recorded on the LTC-UBIT area of the tape when the RET button on the lens is pressed during recording. Recording shot marks[1)] 1 and 2 for scenes containing important images and sounds enables quick access to the marked points. This increases editing efficiency.

For detailed information on shot marker operations, refer to the manual supplied with your VTR.

A setting on the SHOT MARKER page of the MAINTENANCE menu determines whether or not good shot marks are recorded to the tape.

1) Shot mark
Time code of the scene to be used as the editing point when editing.

Setting for recording good shot marks on the LTC-UBIT area on the tape



1 Open the switch cover first. Set the MENU ON/OFF switch to ON while pushing the MENU knob.

The TOP menu appears.

```
      <TOP MENU>

➡USER
 USER MENU CUSTOMIZE
 ALL
 ·OPERATION
 ·PAINT
 ·MAINTENANCE
 ·FILE
 ·DIAGNOSIS
```

2 Turn the MENU knob to move the ➡ mark to MAINTENANCE, then push the MENU knob.

When the MAINTENANCE menu is used for the first time, the CONTENTS page appears.

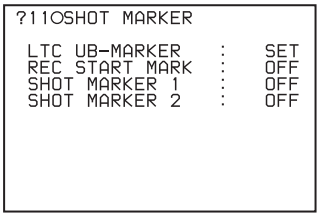
```
?00●CONTENTS        TOP
 ↓↓
 01.WHT SHADING
 02.BLK SHADING
 03.LEVEL ADJ
 04.SD LEVEL ADJ
 05.BATTERY
 06.AUDIO-1
 07.AUDIO-2
 08.AUDIO-3
 09.TIME CODE
 10.VTR MODE
```

Or, if you have used the MAINTENANCE menu before, the page that was on the screen when the last MAINTENANCE menu operation ended appears.

3 When the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➡ mark to SHOT MARKER.

Or, turn the MENU knob until SHOT MARKER appears from the CONTENTS page.

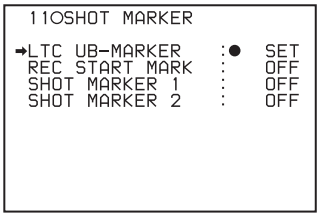
When any page of the MAINTENANCE menu is displayed, turn the MENU knob until the SHOT MARKER page appears.



4 Push the MENU knob.

The ➡ mark moves to the currently selected item and a ● mark appears on the left of the setting.

5 Turn the MENU knob to move the ➡ mark to LTC UB-MARKER.

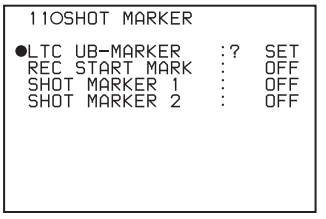


6 Push the MENU knob.

The ➡ mark at the left of LTC UB-MARKER changes to a ● mark and the ● mark at the left of the setting changes to a ? mark.

7 Turn the MENU knob clockwise or counterclockwise until the desired setting appears.

The setting changes in the order of SET ⟷ ALL ⟷ OFF.

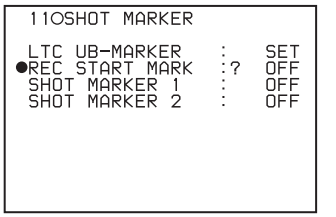


Item	Contents
SET	Determines whether or not marks are recorded for the items REC START MARK, SHOT MARKER 1, and SHOT MARKER 2 which appear when you select SET.
ALL	Records the recording start mark, good shot mark 1, and good shot mark 2.
OFF	Does not record any markers.

When you select SET, go to step **8**.
When you select ALL or OFF, go to step **9**.

8 Set the mark(s) to be recorded to ON.

① Turn the MENU knob to move the ➡ mark to the mark to be set, then push the MENU knob.



② Turn the MENU knob clockwise or counterclockwise until the desired setting appears.
To record the mark on the tape, select ON.
To not record the mark, select OFF.

③ Push the MENU knob.

④ To set the remaining marks, repeat steps ①, ②, and ③.

9 To end the menu operation, set the MENU ON/OFF switch to OFF. Or, close the switch cover.

The menu display disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

Recording a shot mark 1

Press the RET button once. On the viewfinder screen, "●" and the time code of the marked point are displayed for about 3 seconds.

Recording a shot mark 2

Press the RET button twice. On the viewfinder screen, "X" and the time code of the marked point are displayed for about 3 seconds.

3-2-4 Recording a Recording Start Mark

You can record a recording start mark at the beginning of the recording.
Using recording start marks enables quick access to the marked points, for efficient editing.

For detailed information on recording start marker operations, refer to the manual supplied with your VTR.

You can set whether or not recording start marks are recorded using the SHOT MARKER page of the MAINTENANCE menu.

For detailed information on setting whether or not recording start markers are recorded, see "Setting for recording good shot marks on the LTC-UBIT area on the tape" on page 39.

3-2-5 Starting a Shoot with a Few Seconds of Pre-Stored Picture Data (Picture Cache Function: with the HKDW-703)

By installing an optional HKDW-703 extension board in the camcorder, the camcorder is able to constantly store a few seconds (up to 8 seconds) of the most current picture and sound data in the board's memory.
As a result, when you press the VTR START button or the VTR button on the lens, the recording starts with the data stored a few seconds before.

Setting the Picture Cache time/Picture Cache mode

To record in Picture Cache mode, you need to turn on Picture Cache mode and set the picture data storage time (Picture Cache time) using the USER menu.
The Picture Cache time and VTR SAVE/STBY switch settings determine the number of seconds of picture data that will be stored in memory and recorded when you press the VTR START button or VTR button on the lens.
The following table shows the approximate number of seconds worth of picture data (counting back from the time you begin recording) that will be recorded from memory. However, when changing from SAVE to STBY, or under the special situations explained in the notes on this page, the actual amount of data recorded may be shorter.

Picture Cache time setting and recording start point

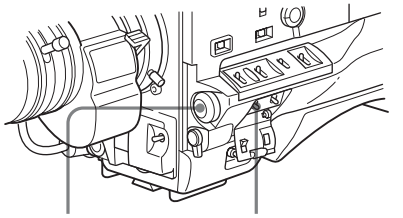
Picture Cache time	Recording start point	
	VTR STBY mode	VTR SAVE mode
8 (seconds) (For 50i/25PsF format)	About 8 seconds before	About 5 seconds before
7 (seconds) (For 59.94i format)	About 7 seconds before	About 4 seconds before
6 (seconds)	About 6 seconds before	About 4 seconds before[1)]
5 (seconds)	About 5 seconds before	About 4 seconds before
4 (seconds)	About 4 seconds before	About 4 seconds before
3 (seconds)	About 3 seconds before	About 3 seconds before
2 (seconds)	About 2 seconds before	About 2 seconds before
1 (second)	About 1 second before	About 1 second before
0 (seconds)	About 0 seconds before	About 0 seconds before

1) For 50i/25PsF format, you can record about 5 second of picture data stored in the memory.

Notes

- After selecting the Picture Cache mode, immediately changing the Picture Cache time, or performing playback or recording review, the picture data stored in memory before this operation becomes unstable. This means that when you press the VTR START button or the VTR button on the lens, the previously stored picture data will not be recorded.
- During playback or recording review, the picture data is not stored in the HKDW-703's memory. Picture data corresponding to the duration of playback or recording review will not be in memory and will not be recorded on tape.

Setting procedure

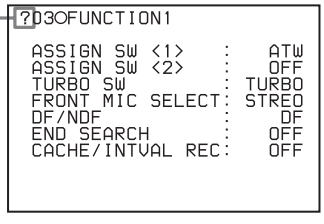


1 Set the MENU ON/OFF switch to ON.

The last accessed menu page appears on the viewfinder screen.

2 Turn the MENU knob until the FUNCTION 1 page appears.

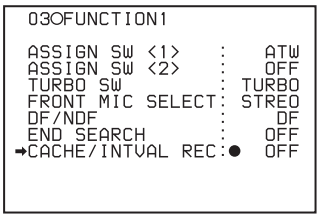
When the question mark appears at the left corner of the title page, you can switch the pages. Turn the MENU knob clockwise or counterclockwise to display the desired page



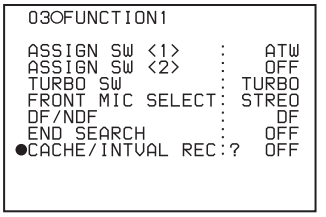
3 Push the MENU knob.

A ➡ mark appears on the left of the currently selected item and a ● mark appears on the left of the setting.

4 Turn the MENU knob to move the ➡ mark to CACHE/INTVAL REC.



5 Push the MENU knob.



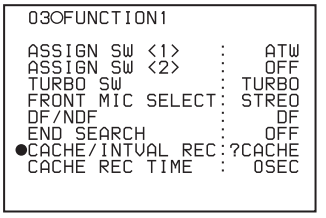
The ➡ mark on the left of CACHE/INTVAL REC changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

6 Turn the MENU knob until CACHE appears.

As you turn the MENU knob, the setting changes in the following sequence: OFF ⟷ CACHE ⟷ A. INT ⟷ M. INT.
When CACHE appears, the camcorder is in Picture Cache mode, where picture, sound, and time code are constantly saved in memory. The TALLY indicator (green) in the viewfinder is on while picture data is being stored in memory.
Also CACHE REC TIME appears.

Note

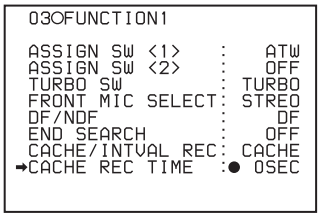
When HD SDI REMOTE I/F *(page 164)* is set to G-TLY on the FUNCTION 3 page of the MAINTENANCE menu, this TALLY indicator does not light in green even in Picture Cache mode.



7 Push the MENU knob.

The ● mark on the left of CACHE/INTVAL REC changes to a ➡ mark, and the camcorder enters the item selection mode.

8 Turn the MENU knob to move the ➡ mark to CACHE REC TIME.



9 Push the MENU knob.

The ➡ mark on the left of CACHE REC TIME changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

10 Turn the MENU knob until the desired Picture Cache time appears.

As you turn the MENU knob, the Picture Cache time changes in the following sequence: 0SEC ⟷ 1SEC ⟷ 2SEC ⟷ 3SEC ⟷ 4SEC ⟷ 5SEC⟷ 6SEC⟷ 7SEC[1)].

1) 7 sec for 59.94i format
8 sec for 50i/25PsF format

11 Push the MENU knob.

The ● mark on the left of CACHE REC TIME changes to a ➡ mark and the ? mark changes to a ● mark.

12 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu disappears, and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder screen.

Settings made in Picture Cache mode are maintained until changed.
You can turn Picture Cache mode on and off by assigning the Picture Cache ON/OFF function to one of the assignable switches (ASSIGN 1/2 and TURBO GAIN).

For detailed information on the assignable *switches, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.*

Note

When recording in Picture Cache mode, VITC is not recorded when the F-RUN/SET/R-RUN switch is set to R-RUN. When it is set to the F-RUN position, VITC is recorded.

Camcorder operations in Picture Cache mode

The recording procedure in Picture Cache time is basically the same as that for normal recording. However, note the following differences.

- When you record in Picture Cache mode, the picture you shoot is recorded to tape after the Picture Cache time elapses. For this reason, the tape does not stop immediately when you press the VTR START button. After the VTR START button is pressed, all tape operation buttons (EJECT, REW, F FWD, PLAY, and STOP) stop functioning until the Picture Cache time has elapsed. During this time, if you press the VTR START button or the VTR button on the lens, recording starts again as if there were no pause in recording.
- The time the tape stops after stopping recording is equals the Picture Cache time set previously. When the picture data for the duration of the Picture Cache time is not stored in memory due to the subsequent operations, the time until the tape stops equals the duration actually stored and may be shorter than the Picture Cache time.
  — You start recording immediately after selecting the Picture Cache mode.
  — You start recording immediately after changing the Picture Cache time.
  — You start recording immediately after playback or recording review.
  — You start recording in the Picture Cache mode immediately after the power is turned on.
- The time code stops advancing while time data is being set (when the F-RUN/SET/R-RUN switch is set to SET). For this reason, if you start recording immediately after switching to F-RUN or R-RUN (i.e., to a position other than SET), you may overwrite a portion of the previously recorded time code.
- Positions of shot marks may be shifted depending on the Picture Cache time setting.
- Menu operation for the Picture Cache time setting is disabled during recording. To change the setting, once stop the recording by pressing the VTR START button or the VTR button on the lens.

When power is lost during recording

- When the power is turned off during recording, the camera will switch itself off after the tape has run for a few seconds.
- If you remove the battery, pull out the DC cable, or cut power to the AC adaptor during recording, actual recording of picture data ends the instant the tape is stopped. However, a certain amount of recorded picture data, equal to that recorded during the Picture Cache time, will be lost, because it has not yet been recorded on the tape before the tape stops. For this reason, make sure you do not change the battery while recording.

When the tape runs out during recording

Please note that if the tape runs out and the camcorder stops during recording, a certain amount of recorded picture data, equal to that recorded during the Picture Cache time, will be lost, because it has not yet been recorded on the tape.

3-2-6 Shooting Picture at Intervals (Interval Rec Function: with the HKDW-703)

Installing an optional HKDW-703 extension board in the camcorder enables the camcorder to record pictures at various intervals. There are two kinds of Interval Rec mode:

Auto Interval Rec

In Auto Interval Rec mode, pictures are automatically shot a frame at a time at the specified interval and stored in memory. To use this function you must set the total time for shooting (TAKE TOTAL TIME) and the length of time for recording on the tape (REC TIME).

Manual Interval Rec

There are two modes of Manual Interval Rec:

- **Single Trigger mode**
  Setting the number of frames to be recorded at one shooting (NUMBER OF FRAME) enables the camcorder to record the number of frames preset each time the VTR START button or the VTR button on the lens is pressed.
- **Continuous Trigger mode**
  Pictures are automatically shot by preset frames at preset intervals by pressing the VTR START button or the VTR button on the lens.

In Auto Interval Rec and Continuous Trigger mode of Manual Interval Rec, by setting the PRE-LIGHTING function to ON, the light connected to the LIGHT connector automatically turns on before recording starts. This allows you to record pictures under stable light and color temperature conditions.

Auto Interval Rec mode settings

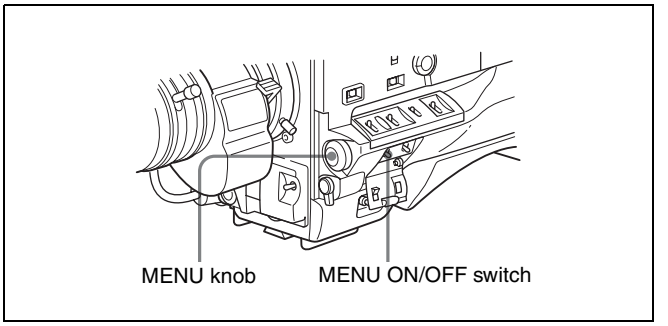
To make settings before shooting

To record in Auto Interval Rec mode, you need to turn on Auto Interval Rec and set the total time from start to finish of shooting (TAKE TOTAL TIME) and the length of time for recording on the tape (REC TIME), using the USER menu.

Notes

- To make settings for Auto Interval Rec mode, set TAKE TOTAL TIME first, then REC TIME.
- To turn on the light automatically before recording starts, set the LIGHT switch to AUTO.

To turn on Auto Interval Rec mode, proceed as follows.



1 Set the MENU ON/OFF switch to ON.

The last accessed menu page appears on the viewfinder screen.

2 Turn the MENU knob until the FUNCTION 1 page appears.

When the question mark appears at the left corner of the title page, you can switch the pages. Turn the MENU knob clockwise or counterclockwise to display the desired page.

```
?03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         : TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
 CACHE/INTVAL REC:    OFF
```

3 Push the MENU knob.

A ➡ mark appears on the left of the currently selected item and a ● mark appears on the left of the setting.

4 Turn the MENU knob to move the ➡ mark to CACHE/INTVAL REC.

```
 03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         : TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
➡CACHE/INTVAL REC:●   OFF
```

5 Push the MENU knob.

The ➡ mark on the left of CACHE/INTVAL REC changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

```
 03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         : TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
●CACHE/INTVAL REC:?   OFF
```

6 Turn the MENU knob until A. INT appears.

As you turn the MENU knob, the setting changes in the following sequence: OFF ⟷ CACHE ⟷ A. INT ⟷ M. INT.
When A. INT appears, the camcorder is in Auto Interval Rec mode. The TALLY indicator (green) in the viewfinder flashes (one flash/second) while the camcorder is in this mode. Also, TAKE TOTAL TIME, REC TIME and PRE-LIGHTING appear.

```
 03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         : TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
●CACHE/INTVAL REC:?A.INT
 TAKE TOTAL TIME  :   5MIN
 REC TIME         :   5SEC
 PRE-LIGHTING     :    OFF
```

7 Push the MENU knob.

The ● mark on the left of CACHE/INTVAL REC changes to a ➡ mark, and the camcorder enters the item selection mode.

8 Turn the MENU knob to move the ➡ mark to TAKE TOTAL TIME.

```
 03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         : TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
 CACHE/INTVAL REC:?A.INT
➡TAKE TOTAL TIME  :   5MIN
 REC TIME         :   5SEC
 PRE-LIGHTING     :    OFF
```

9 Push the MENU knob.

The ➡ mark on the left of TAKE TOTAL TIME changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

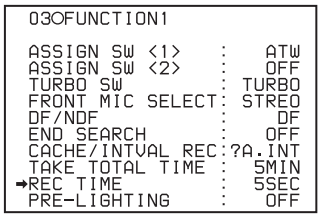
10 Turn the MENU knob until the desired setting of TAKE TOTAL TIME appears.

As you turn the MENU knob, the setting of TAKE TOTAL TIME changes in the following sequence:
5MIN ⟷ 10MIN ⟷ 15MIN ⟷ 20MIN ⟷ 30MIN ⟷ 40MIN ⟷ 50MIN ⟷ 1H ⟷ 2H ⟷ 3H ⟷ 4H ⟷ 5H ⟷ 7H ⟷ 10H ⟷ 15H ⟷ 20H ⟷ 30H ⟷ 40H ⟷ 50H ⟷ 70H ⟷ 100H.
(MIN = minutes; H = hours)

11 Push the MENU knob.

The ● mark on the left of TAKE TOTAL TIME changes to a ➡ mark and the ? mark changes to a ● mark.

12 Turn the MENU knob to move the ➡ mark to REC TIME.



13 Push the MENU knob.

The ➡ mark on the left of REC TIME returns to a ● mark and the ● mark of the setting returns to a ? mark.

14 Turn the MENU knob until the desired time to be recorded on the tape appears.

As you turn the MENU knob, the setting of REC TIME changes in the following sequence:
5SEC ⟷ 10SEC ⟷ 15SEC ⟷ 20SEC ⟷ 30SEC ⟷ 40SEC ⟷ 50SEC ⟷ 1MIN ⟷ 2MIN ⟷ .....38MIN ⟷ 39MIN ⟷ 40MIN[1)].
(SEC = seconds; MIN = minutes)

1) You can select a time up to 40MIN for 59.94i format, and 48MIN for 50i/25PsF format.

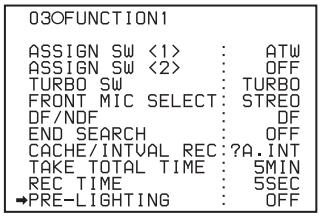
Note

You cannot set a REC TIME that is more than one thirtieth of TAKE TOTAL TIME.
For example: When TAKE TOTAL TIME is set to 1H, the maximum value of REC TIME is 2 MIN. (60 minutes divided by 30 gives 2 minutes.)
The time setting displayed when you turn the MENU knob changes within the available setting times.
Be sure to set REC TIME only after setting TAKE TOTAL TIME.

15 Push the MENU knob.

The ● mark on the left of REC TIME returns to a ➡ mark and the ? mark returns to a ● mark.

16 Turn the MENU knob to move the ➡ mark to PRE-LIGHTING.



17 Push the MENU knob.

The ➡ mark on the left of PRE-LIGHTING changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

18 Turn the MENU knob until the desired time to turn on the light before starting to record appears.

As you turn the MENU knob, the PRE-LIGHTING time changes in the following sequence: OFF ⟷ 2SEC ⟷ 5SEC ⟷ 10SEC.

Notes

- Set the LIGHT switch on the camcorder to AUTO to turn on the light before recording.
  The light switch must also be set to ON. With these settings, the light turns on and off automatically. (However, the light remains on continuously if the off time is less than 5 seconds.)
- When the LIGHT switch is set to MANUAL and the light switch is set to ON, the light remains on continuously.

19 Push the MENU knob.

The ● mark on the left of PRE-LIGHTING returns to a ➡ mark and the ? mark returns to a ● mark.

20 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu display disappears from the viewfinder screen and the message AUTO INTERVAL **M**S indicating Auto Interval Rec mode appears along the bottom of the viewfinder.
MS indicates the shooting interval. For example, when TAKE TOTAL TIME is set to 1H and REC TIME is set to 30 SEC, the message AUTO INTERVAL 00M04S appears. The shooting interval is 4 seconds.
The display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

Note

The settings for Auto Interval Rec mode are maintained until changed. However, if you switch off the camcorder power, Auto Interval Rec mode is cleared except for the TAKE TOTAL TIME, REC TIME and PRE-LIGHTING settings. To use the Auto Interval Rec function again after switching on the power, perform steps **1** to **6**.

Recording in Auto Interval Rec mode

Note

When you use blank cassettes, such as brand new cassettes, be sure to record color bars for more than 2 seconds at the beginning of a cassette.

1 After performing the basic procedures for shooting and recording, following the instructions in *"3-2-1 Basic Procedures" (page 37)*, secure the camcorder so that it will not move.

2 Press the VTR START button on the camcorder or the VTR button on the lens.

The camcorder starts recording in Auto Interval Rec mode. When you use the PRE-LIGHTING function, recording starts after the light is switched on.
The actual recording to tape begins after the camcorder has saved about five seconds of video in memory, so tape access is intermittent.
While recording in Auto Interval Rec mode, the TALLY indicator (green) in the viewfinder flashes (4 flashes/second) and the message "AUTO INTERVAL **M**S" flashes on the viewfinder screen.
When the camcorder is capturing the picture in memory, the REC indicator in the viewfinder lights.
After the length of time for recording on the tape (REC TIME) has elapsed, the camcorder automatically stops recording.

To continue auto interval recording

Press the VTR START button on the camcorder or the VTR button on the lens again.
The camcorder starts recording in Auto Interval Rec mode again.

To interrupt auto interval recording

Press the VTR START button or the VTR button on the lens. The camcorder stops recording.
However, the tape may run to record picture data already stored in memory.

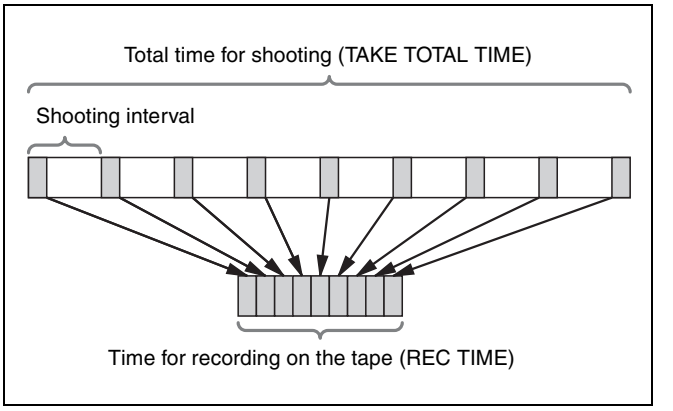
To end auto interval recording

You can exit Auto Interval Rec mode using the following two methods:

- Set the POWER switch to OFF.
- Set CACHE/INTVAL REC to OFF on the FUNCTION 1 page of the USER menu.

Time required for shooting and time required for recording on the tape

Auto Interval Rec mode is effective for shooting objects that move very slowly. To use this function, you need to set the total time for shooting (TAKE TOTAL TIME) and the length of time for recording on the tape (REC TIME).
The time required for shooting is the time required to capture the very slowly moving subject, and the camcorder must be arranged so that during this time the subject is always in the frame.
The tape recording time indicates the running time of the completed recording. The camcorder calculates the time-lapse interval from these two times.



Notes on Auto Interval Rec operation

Time code

In Auto Interval Rec mode, the internal time code generator runs in R-RUN mode regardless of how the F-RUN/SET/R-RUN switch is set.
Time code set in the menu is saved in the user bits.

Audio

Audio signals are not recorded in Auto Interval Rec mode.

Cassette control buttons

While recording in Auto Interval Rec mode, you cannot use the cassette control buttons (EJECT, REW, F FWD, PLAY and STOP). To use these buttons, stop recording by pressing the VTR START button or the VTR button on the lens.

Menu operation

While recording in Auto Interval Rec mode, you cannot change the settings of CACHE/INTVAL REC, TAKE TOTAL TIME and REC TIME. To change the settings, stop recording by pressing the VTR START button or the VTR button on the lens.

When the camcorder power is switched off during recording in Auto Interval Rec mode

- When you set the POWER switch to OFF, the camcorder will switch itself off after the tape has run for a few seconds to record the picture data stored in memory.
- If you remove the battery, unplug the DC cable, or cut power to the AC adaptor during auto interval recording, picture data stored before recording stops (a maximum of 5 seconds) may be lost. Take care when changing the battery.

When tape runs out during auto interval recording

Note that picture data (a maximum of 5 seconds) shot and stored before the tape stops is not recorded if the tape runs out and the camcorder stops.

Manual Interval Rec mode

Manual Interval Rec has the following two modes.

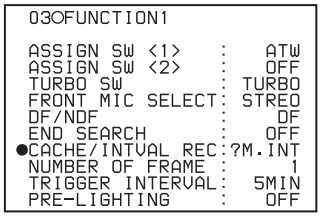
Single Trigger mode: Each time the VTR START button or VTR button on the lens is pressed, the camcorder captures to memory a single shot consisting of the specified number of video frames.

Continuous Trigger mode: Once the VTR START button or VTR button on the lens is pressed, the camcorder captures consecutive shots to memory at the specified interval, with each shot consisting of the specified number of video frames.

Setting Single Trigger mode of Manual Interval Rec

1 Follow steps **1** to **5** in *"To make settings before shooting" (page 43)*, to select CACHE/INTVAL REC on the FUNCTION 1 page.

2 Turn the MENU knob until M. INT appears.

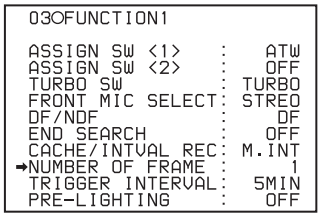


As you turn the MENU knob, the setting changes in the following sequence: OFF ⟷ CACHE ⟷ A. INT ⟷ M. INT.
When M. INT appears, the camcorder is in Manual Interval Rec mode and the TALLY indicator (green) in the viewfinder flashes. NUMBER OF FRAME, TRIGGER INTERVAL and RE-LIGHTING appear.

3 Push the MENU knob.

The ● mark on the left of CACHE/INTVAL REC changes to a ➡ mark and the ? mark on the left of the setting changes to a ● mark.

4 Turn the MENU knob to move the ➡ mark to NUMBER OF FRAME.



5 Push the MENU knob.

The ➡ mark on the left of NUMBER OF FRAME changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

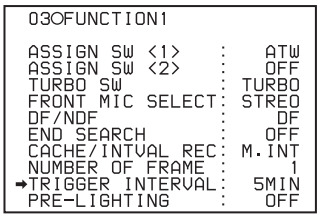
6 Turn the MENU knob until the desired number of frames to be recorded in each shot appears.

As you turn the MENU knob, the number changes in the following sequence: 1 ⟷ 2 ⟷ 4 ⟷ 8.

7 Push the MENU knob.

The ● mark on the left of NUMBER OF FRAME returns to a ➡ mark and the ? mark on the left of the setting returns to a ● mark.

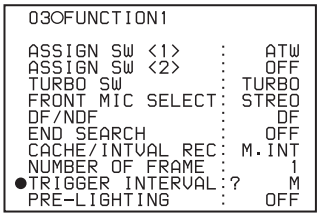
8 Turn the MENU knob to move the ➡ mark to TRIGGER INTERVAL.



9 Push the MENU knob.

The ➡ mark on the left of TRIGGER INTERVAL changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

10 Turn the MENU knob to display M.



If you turn the MENU knob clockwise or counterclockwise, the number changes in the following sequence: M ⟷ 1SEC ⟷ 2SEC.....12H ⟷ 24H.
When M appears, the TALLY indicator (green) flashes (2 flashes/second) and PRE-LIGHTING disappears.

11 Push the MENU knob.

The ● mark on the left of TRIGGER INTERVAL returns to a ➡ mark and the ? mark on the left of the setting returns to a ● mark.

12 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu display disappears from the viewfinder screen and the message MANU INTERVAL *FRAME, indicating the single trigger mode of the Manual Interval Rec mode, appears along the bottom of the viewfinder.
*FRAME indicates the number of frames set in step **6**.
The display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

Note

The settings for Single Trigger mode of Manual Interval Rec are maintained until changed. However, if you switch the camcorder power off, all Manual Interval Rec mode settings are cleared except for the NUMBER OF FRAME setting and the single trigger mode selection. To use Single Trigger mode of the Manual Interval Rec function again after switching on the power, perform steps **1** and **2**.

Recording in Single Trigger mode of Manual Interval Rec

Follow the procedure below to shoot a picture in Single Trigger mode of Manual Interval Rec.

Note

When you use blank cassettes, such as brand new cassettes, be sure to record color bars for more than 2 seconds at the beginning of a cassette.

1 After performing the basic procedure for shooting and recording following the instructions in *"3-2-1 Basic Procedures" on page 37*, secure the camcorder so that it will not move.

2 Push the VTR START button on the camcorder or the VTR button on the lens.

The camcorder starts recording in Single Trigger mode of Manual Interval Rec. The TALLY indicator (green) in the viewfinder flashes (2 flashes/second) and the message MANU INTERVAL *FRAME flashes on the viewfinder screen.
Each time you press the VTR START button or the VTR button, the camcorder captures and stores the picture data of the preset number of frames. The REC indicator in the viewfinder is on while the camcorder is capturing the picture in the memory. The camcorder stores picture data (about 5 seconds worth) in memory, and then actually records the stored picture data on the tape. The tape runs intermittently.

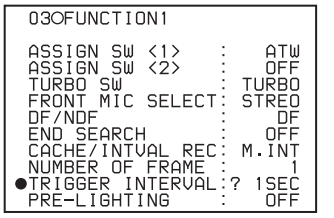
To stop recording in Single Trigger mode

You can stop recording in Single Trigger mode of Manual Rec Interval using the following two methods. However, the tape may continue to run to record the picture data stored in the memory at the instant the tape stopped.
- Press the EJECT button.
- Set the POWER switch to OFF.

Setting Continuous Trigger mode of Manual Interval Rec

1 Follow steps **1** to **9** in *"Setting Single Trigger mode of Manual Interval Rec" on page 47*.

2 Turn the MENU knob clockwise or counterclockwise to display the desired trigger interval.



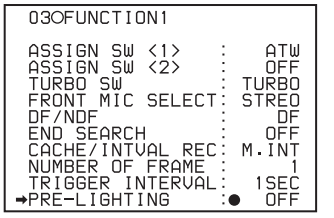
If you turn the MENU knob clockwise or counterclockwise, the number changes in the following sequence: M ⟷ 1SEC ⟷ 2SEC ⟷ 3SEC ⟷ 4SEC ⟷ 5SEC ⟷ 6SEC ⟷ 7SEC ⟷ 8SEC ⟷ 9SEC ⟷ 10SEC ⟷ 15SEC ⟷ 20SEC ⟷ 30SEC ⟷ 40SEC ⟷ 50SEC ⟷ 1MIN ⟷ 2MIN ⟷ 3MIN ⟷ 4MIN ⟷ 5MIN ⟷ 6MIN ⟷ 7MIN ⟷ 8MIN ⟷ 9MIN ⟷ 10MIN ⟷ 15MIN ⟷ 20MIN ⟷ 30MIN ⟷ 40MIN ⟷ 50MIN ⟷ 1H ⟷ 2H ⟷ 3H ⟷ 4H ⟷ 6H ⟷ 12H ⟷ 24H.

When a trigger interval time other than M is displayed, the camcorder is in Continuous Trigger mode of Manual Interval Rec. The TALLY indicator (green) flashes (1 flash/second).

3 Push the MENU knob.

The ? mark on the left of setting returns to a ● mark, and the ● mark on the left of TRIGGER INTERVAL returns to an ➡ mark.

4 Turn the MENU knob to move the ➡ mark to PRE-LIGHTING.



5 Push the MENU knob.

The ➡ mark on the left of PRE-LIGHTING changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

6 Turn the MENU knob clockwise or counterclockwise until the desired time interval at which to turn on the light before recording starts appears.

If you turn the MENU knob clockwise or counterclockwise, the PRE-LIGHTING time changes in the following sequence: OFF ⟷ 2SEC ⟷ 5SEC ⟷ 10SEC.

Notes

- To turn on the light automatically before recording starts by setting the PRE-LIGHTING item to ON, be sure to set the LIGHT switch to AUTO. Also, set the switch of the light connected to the LIGHT connector to ON.
  The light automatically turns on and off in Continuous Trigger mode of Manual Interval Rec. However, if the duration the light should be off is less than 5 seconds, the light is on continuously.
- When the LIGHT switch is set to MANUAL and the switch of the light is set to ON, the light is always on.

7 Push the MENU knob.

The ? mark on the left of setting returns to a ● mark and the ● mark on the left of PRE-LIGHTING returns to an ➡ mark.

8 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu display disappears from the viewfinder screen and the message INTERVAL *SEC *FRAME, indicating Continuous Trigger mode of Manual Interval Rec, appears along the bottom of the viewfinder.
*SEC indicates the trigger interval preset and *FRAME indicates the number of frames preset.
The display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

Note

The settings for Continuous Trigger mode of Manual Interval Rec are maintained until changed. However, if you switch the camcorder power off, all Manual Interval Rec mode settings are cleared except for the NUMBER OF FRAME, TRIGGER INTERVAL, and PRE-LIGHTING settings. To use Continuous Trigger mode of Manual Interval Rec again after switching on the power, perform steps **1** and **2** in *"Setting Single Trigger mode of Manual Interval Rec" on page 47*.

Recording in Continuous Trigger mode of Manual Interval Rec

Note

When you use blank cassettes, such as brand new cassettes, be sure to record color bars for more than 2 seconds at the beginning of a cassette.

1 After performing the basic procedures for shooting and recording following the instructions in *"3-2-1 Basic Procedures" on page 37*, secure the camcorder so that it will not move.

2 Push the VTR START button on the camcorder or the VTR button on the lens.

The camcorder starts recording in Continuous Trigger mode of Manual Interval Rec, and the flashing cycle of the TALLY indicator (green) changes from 1 flash/second to 4 flashes/second, and the message INTERVAL *SEC *FRAME flashes on the viewfinder screen.
When you use the PRE-LIGHTING function, the light turns on when you press the VTR START button. After the preset PRE-LIGHTING time has elapsed, the camcorder captures the picture in the memory. The camcorder stores picture data (about 5 seconds worth) in memory, and then actually records the stored picture data on the tape. As a result, the tape runs intermittently. The REC indicator in the viewfinder is on while the camcorder is capturing the picture in the memory.

To stop recording in Continuous Trigger mode of Manual Interval Rec

You can stop recording in Continuous Trigger mode of Manual Interval Rec using the following two methods. However, the tape may continue to run to record the picture data stored in the memory at the instant the tape stopped.

- Press the VTR START button or the VTR button on the lens.
- Set the POWER switch to OFF.

Notes on Manual Interval Rec operation

Take note of the following points which are common to Single Trigger mode and Continuous Trigger mode. Differences are clearly noted, if any.

Time code

In Manual Interval Rec mode, the internal time code generator runs in R-RUN mode regardless of how the F-RUN/SET/R-RUN switch is set.

Audio

Audio signals are not recorded in Manual Interval Rec mode.

Cassette control buttons

While recording in Single Trigger mode of Manual Interval Rec (the green TALLY indicator in the viewfinder flashes (2 flashes/second)), you cannot use the cassette control buttons (REW, F FWD, PLAY and STOP). Note that the camcorder stops recording in the single trigger mode of the Manual Interval Rec mode if you press the EJECT button.

While recording in Continuous Trigger mode of Manual Interval Rec (the TALLY indicator (green) flashes (4 flashes/second)), you cannot use the cassette control buttons (EJECT, REW, F FWD, PLAY and STOP). To stop recording, press the VTR START button or the VTR button on the lens. However, the tape may run to record the picture data stored in the memory before stopping the manual interval recording.

Menu operation

In Single Trigger mode of Manual Interval Rec, you cannot change the settings of CACHE/INTVAL REC and NUMBER OF FRAME on the FUNCTION 1 page after the camcorder starts recording. To change the settings, stop recording by pressing the EJECT button or setting the POWER switch to OFF.

While recording in Continuous Trigger mode of Manual Interval Rec, you cannot change the settings of CACHE/INTVAL REC, NUMBER OF FRAME and TRIGGER INTERVAL on the FUNCTION 1 page. To change these settings, stop recording by pressing the VTR START button or the VTR button on the lens or by setting the POWER switch to OFF.

When the camcorder power is switched off during recording in Manual Interval Rec mode

- When you set the POWER switch to OFF, the camcorder will switch itself off after tape access has continued for a few seconds to record the picture data stored in memory.
- If you remove the battery, unplug the DC cable, or cut the power to the AC adaptor during manual interval recording, picture data stored before recording stops (a maximum of 5 seconds) may be lost. Take care when changing the battery.

When tape runs out during recording in Manual Interval Rec mode

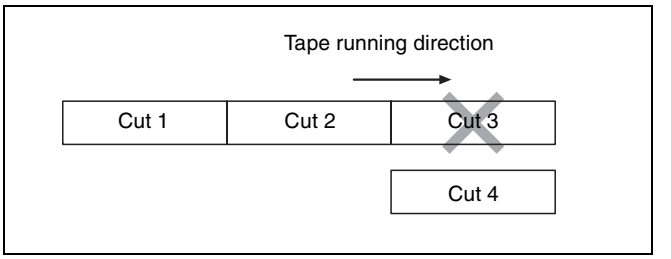
Note that picture data (a maximum of 5 seconds) at the instant the tape stopped is not recorded if the tape runs out and the camcorder stops.

3-2-7 Continuous Recording on Previous Cut

By assigning the RE-TAKE function to the ASSIGN 1 switch, you can use the ASSIGN 1 switch to position the tape at the most recent cut, clear it and record the new cut.

For detailed information, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

Continuous recording the new cut after the cut before the most recent cut



Example: After recording cut 3, clearing cut 3 and recording cut 4 after cut 2

1 Press the button on the lens while holding the ASSIGN 1 switch down, in the above example, with the camcorder in the recording pause mode after recording the cut 3.

The camcorder automatically positions the tape at the end point of cut 2 and turns in the recording pause mode.

2 Record cut 4.

Cut 4 is recorded after cut 2.

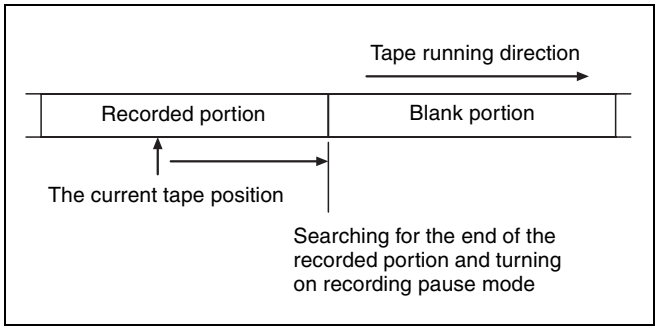
Notes

- When pictures consisting of cuts recorded using the RE-TAKE function are played back on a VTR for professional use, the CHANNEL CONDITION indicator, which indicates the condition of the played back signal of the VTR, may be lit in yellow, noise may be added to the cue audio for the first 2 or 3 seconds, or the previously recorded timecode may be displayed for a few seconds. To avoid this, it is recommended that you make the first part of the cut (in the above *"Example: After recording cut 3, clearing cut 3 and recording cut 4 after cut 2"*, cut 4) about 3 seconds longer.
- In the following cases, the RE-TAKE function is not accepted. The message "INVALID OPERATION!" is displayed on the viewfinder screen for three seconds.
  —When only one cut has been recorded
  —When the length of the recorded cuts is less than 3 seconds
  —When Picture Cache is ON
  The RE-TAKE function is also not accepted after recording stops until the recording pause operation is completed (about 1 second). The message "INVALID OPERATION!" is displayed. In this case, the RE-TAKE function will be accepted when you perform the RE-TAKE operation again after the message disappears.

3-2-8 Searching for the Last Recorded Portion and Turning on Recording Pause Mode (End Search Function)

The End Search function allows the camcorder to search for the end of the recording on the tape after the recorded portion is rewound and played back.
To use this function, set the END SEARCH function to ON on the FUNCTION 1 page of the USER menu.

For detailed information on menu operation, see "5-1-2 Basic Menu Operations" on page 76.


Tape running direction
Recorded portion
Blank portion
The current tape position
Searching for the end of the recorded portion and turning on recording pause mode

END SEARCH function

Searching for the end of the recording and turning on recording pause mode

1 Rewind the tape being recorded, then push the PLAY button to start playback.

2 Press the STOP button after checking the recorded image to turn in recording pause mode.

3 Press the RET button on the lens.

The tape automatically runs and stops at the end of the recording. The camcorder is in recording pause mode.

Note

When the STOP KEY FREEZE function is set to become active on the VTR MODE page of the MAINTENANCE menu, the picture is frozen once you push the STOP button during playback. To activate the end search function, push the STOP button again to stop the camcorder, then push the RET button on the lens.

3-3 Checking Recording and Playback

By pressing the PLAY button, you can review any length of recording in the viewfinder in black and white. There are two other ways to review the recording.

- **Recording review:** You can view the last 2 seconds of the recording in the viewfinder in black and white.
- **Color playback:** You can see the recording in color on a color video monitor without the need for any external adaptor.

You may also view the picture during searching by rewinding or fast forwarding by pressing the PLAY + REW button or PLAY + F FWD button.

See "2-3 Audio Functions" on page 19 for information about the switches and controls used to select the audio output signal and to adjust the audio level.

Note

If you play back the tape recorded on this camcorder by using the HDW-F900 HD camcorder, the noise may occur.

3-3-1 Checking the Last Two Seconds of the Recording — Recording Review

If you press the RET button on the lens while recording is paused, the last 2 seconds of the recording is played back on the viewfinder screen and the color LCD. Use this function to check whether recording went smoothly. If you hold the RET button down longer, at most 10 seconds of the tape is rewound and played back. After playback, the camcorder is ready to start recording again.
By assigning the LENS RET function to the ASSIGN 1 switch or the TURBO GAIN button, you can use the ASSIGN 1 switch or the TURBO GAIN button in the same way as the RET button on the lens.

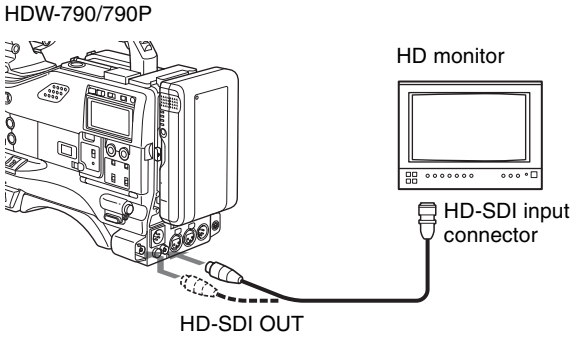
For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

Note

The recording review functions only works if the recording you have made is at least 3 seconds long.

3-3-2 Checking the Recording on the Color Video Monitor — Playback in Color

Connect an HD color video monitor with an HD-SDI input connector to the HD-SDI OUT connector of the camcorder. By pressing the PLAY button, you can view the recorded picture.



Notes

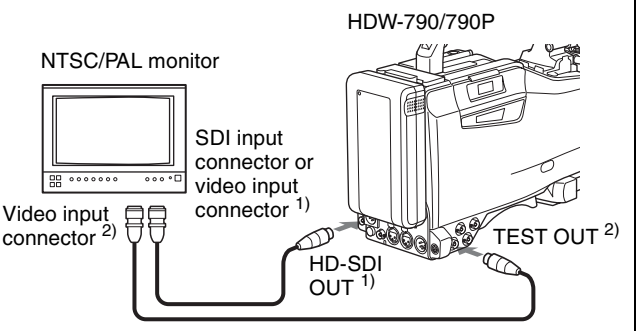
- If HD SDI OUT is set to OFF on the OUTPUT SEL page of the USER menu, you cannot view the recorded picture. Set HD SDI OUT to ON.
- When an optional HKDW-702 is installed, connect an HD color video monitor to the HD-SDI OUT connector located on the rear of the camcorder.

For details, see "5-3-2 Selecting Output Signals" on page 94.

When using an optional HKDW-702 extension board for down converting

Connect the color video monitor to the TEST OUT connector or the HD-SDI OUT connector of the camcorder located on the side of the camcorder. By pressing the PLAY button, you can view the recorded picture.
The signal output from each connector depends on the menu settings.

For details, see "5-3-2 Selecting Output Signals" on page 94.



1) For the output signal from the HD-SDI OUT connector, when SDI is selected on the OUTPUT SEL page of the USER menu, connect this connector to the SDI input connector. When VBS is selected, connect it to the video input connector.
2) When SD is selected as the output signal from the TEST OUT connector, connect this connector to the video input connector.

3-3-3 Checking the Camera Picture on the Viewfinder and/or Color Video Monitor

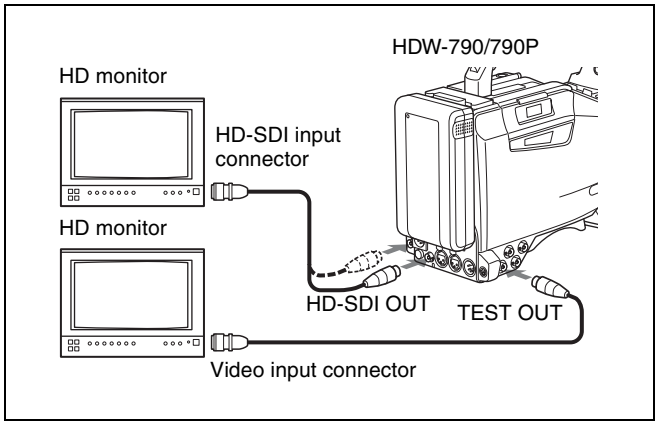
Usually, during playback of a tape, if you press the PLAY button, the image sent to the viewfinder, the TEST OUT connector, or the HD-SDI OUT connector is switched back and forth between the camera image and the recorded image.
However, the PB VIDEO item on the FUNCTION 2 page of the OPERATION menu allows you to change the setting so that the image seen through the camera is sent to the viewfinder and the TEST OUT connector even while you are playing back a video tape.
The HD SDI output from the HD-SDI OUT connector is switched to that of the recorded image during playback, regardless of the PB VIDEO setting.

To output recorded video signal to the viewfinder, TEST OUT connector, and the HD-SDI OUT connectors

For PB VIDEO *(page 146)* on the FUNCTION 2 page of the OPERATION menu, set ALL/HDSDI to ALL.

To output the recorded video signals to the HD-SDI OUT connector, and the camera image to the viewfinder and the TEST OUT connector

For PB VIDEO *(page 146)* on the FUNCTION 2 page of the OPERATION menu, set ALL/HDSDI to HDSDI.

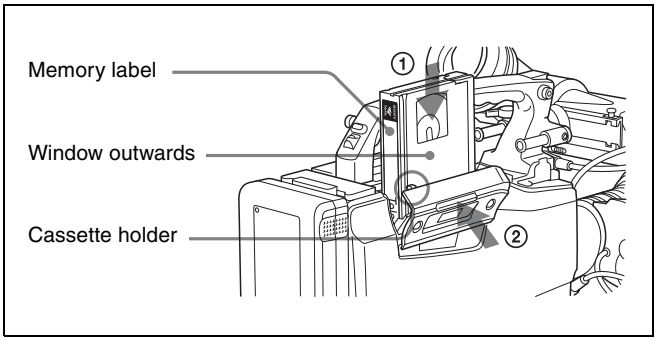


3-4 Recording the Recording Start Time Code onto the Memory Label — Tele-File

The VTR section is compatible with the Tele-File memory label system. This system allows you to record the recording start time code, model name, serial number and tape format onto an optional MLB-1M-100 memory label. Also, a Tele-File mark, that is, a rating of the images recorded just before they are recorded, can be recorded onto the memory label with the recording start time code, every time the unit enters the recording pause mode. This is very helpful for management of the cassette tapes and to improve the efficiency of tape editing.
The memory label attached to the cassette is detected automatically.

3-4-1 Recording the Recording Start Time Code onto the Memory Label

1 Insert the cassette onto which the MLB-1M-100 memory label has been attached into the camcorder.



2 Press the VTR START button or the VTR button on the lens.

At the instant the recording starts, the time code of the recording start is recorded on the memory label.

3-4-2 Recording a Tele-File Mark (OK/NG/KP) onto the Memory Label

A Tele-File mark, that is, a rating of the images recorded just before they are recorded, can be recorded onto the memory label with the recording start time code, every time the unit enters the recording pause mode.

The following three Tele-File marks are available:
- OK: Place this mark when you decide the recorded images are good.
- NG: Place this mark when you decide the recorded images are not good.
- KP: Place this mark when it is hard to decide whether or not the recorded images are good just after recording, or when you want to insert a mark between multiple shots.

Recorded Tele-File marks are read by studio-use devices, logging software, and so on, which support the Tele-File function. These marks are very helpful for improving the efficiency of tape editing.

Before recording a Tele-File mark

To use this function, the TELE-FILE MARK function should be assigned to the ASSIGN 1 switch or TURBO GAIN button.

For details, see "5-3-5 Assigning Functions to Assignable Switches" on page 96.

Recording Tele-File marks

1 Start recording and set the camcorder to recording pause mode by pushing the VTR START button or the VTR button on the lens.

2 Push the ASSIGN 1 switch or the TURBO GAIN button to which the TELE-FILE MARK function is assigned.

The mark to be recorded appears on the viewfinder. When you record a Tele-File mark for the first time after you turn on the power of the camcorder, the mark selected on the menu appears.

For details, see " Setting the Tele-File mark to be recorded for the first time after power on" on page 54.

When OK is selected on the menu

This message disappears after 3 seconds. The mark displayed when it disappears from the viewfinder is recorded with the recording start time code.

Message	Meaning
TELE-FILE MARK: OK	States that an OK mark has been recorded.
TELE-FILE MARK: NG	States that an NG mark has been recorded.
TELE-FILE MARK: KP	States that a KP mark has been recorded.
TELE-FILE MARK: ERASE	States that the Tele-File mark recorded on that shot has been cancelled.

If the mark displayed on the viewfinder is different from the desired one

Push the ASSIGN 1 switch several times while the mark is displayed until the appropriate mark appears on the viewfinder. The mark changes in the order of OK → NG → KP → ERASE ….

If the display disappears before you select the appropriate mark

Continue pushing the ASSIGN 1 switch until the desired mark appears. If the desired mark disappears from the viewfinder while that mark is displayed, the mark recorded before will be overwritten and the mark newly displayed is recorded.

Notes

- Tele-File marks are recorded only when they are recorded using the ASSIGN 1 switch to which this function has been assigned.
- Tele-File marks can be added only to the shot recorded just before entering the rec pause mode.

When the message "INVALID OPERATION !" appears

This message appears when you perform one of the following misoperations:
- You push the ASSIGN 1 switch before the camcorder enters the recording pause mode after loading the cassette.
- If you turn off the power of the camcorder in recording pause mode and then turn on the power again, the camcorder is in the recording pause mode. Then, you push the ASSIGN 1 switch in this situation.
- You push the ASSIGN 1 switch in a mode other than recording pause mode.

Setting the Tele-File mark to be recorded for the first time after power on

Using the menu, you can select the mark to be recorded in the first recording pause mode when you press the ASSIGN 1 switch after you turn on the power of the camcorder.

Note

This menu setting allows the camcorder to display a mark when you use the Tele-File mark for the first time after you turn on the power of the camcorder. When you press the ASSIGN 1 switch after that, the last selected mark appears.

Even if you press the ASSIGN 1 switch when a Tele-File mark is not displayed, the Tele-File mark set on the menu will not be displayed.

1 Set the MENU ON/OFF switch to ON while pushing the MENU knob.

The TOP menu appears.

```
      <TOP MENU>

➡USER
 USER MENU CUSTOMIZE
 ALL
 ·OPERATION
 ·PAINT
 ·MAINTENANCE
 ·FILE
 ·DIAGNOSIS
```

2 Turn the MENU knob to move the ➡ mark to FILE, then push the MENU knob.

When the FILE menu is used for the first time, the CONTENTS page appears.
Or, if you have used the FILE menu before, the page that was on the screen when the last menu operation ended appears.

3 When the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➡ mark to TELE FILE, then push the MENU knob again.

When any page of the FILE menu is displayed, turn the MENU knob until the TELE FILE page appears, then push the MENU knob.
The TELE FILE page appears.

```
  11 TELE FILE      TOP

➡TELE FILE CLEAR :● EXEC
 TELE FILE MARK  :    OK

ID:
SIZE   :     1KBYTE
REMAIN :  100%
STATUS : STANBY
```

4 Turn the MENU knob to move the ➡ mark to TELE FILE MARK, then push the MENU knob.

```
  11OTELE FILE      TOP

 TELE FILE CLEAR :  EXEC
●TELE FILE MARK  :?   OK

ID:
SIZE   :     1KBYTE
REMAIN :  100%
STATUS : STANBY
```

The ➡ mark to the left of TELE FILE MARK changes to a ● mark, and the ● mark to the left of the setting changes to a ? mark.

5 Turn the MENU knob clockwise or counterclockwise until the desired Tele-File mark appears.

The Tele-File mark changes in the order of OK ⟷ NG ⟷ KP…

Setting	Contents
OK	When the recorded image is good.
NG	When the recorded image is not good.
KP	When you cannot judge whether the recorded image is good or not good, or when you want to record the mark as the break of multiple shots.

6 Push the MENU knob.

The ● mark to the left of TELE FILE MARK changes to a ➡ mark, and the ? mark to the left of the setting changes to a ● mark.

7 To end menu operation, set the MENU ON/OFF switch to OFF.

3-4-3 Warning/Error Messages in Memory Label Operation

When Tele-File marks cannot be recorded correctly or may not be recorded, warning/error messages appear.

Warning messages

"TELE-FILE MEMORY FULL!"

- You have loaded a cassette with a memory label whose memory capacity is 0 % attached.
- You have loaded a cassette with a memory label whose memory capacity is 0 % attached, and you are starting / stopping the recording.

"TELE-FILE NEAR FULL!"

The remaining capacity of the memory label is about 5 % or less, but Tele-File marks are still correctly recorded.

Error messages

"NO TELE-FILE!"

A cassette tape without a memory label has been loaded.

"TELE-FILE FULL!"

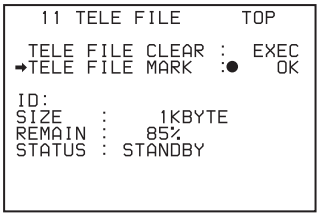
The remaining capacity of the memory label has reached 0 %.

"TELE-FILE WRITE PROTECT!"

The memory label is write-protected.

3-4-4 Confirming the Remaining Capacity on the Memory Label

1 Follow steps **1** to **3** in *"Setting the Tele-File mark to be recorded for the first time after power on" (page 54)* to display the TELE FILE page of the FILE menu.



The remaining capacity of the memory label is displayed on the REMAIN line.
You can record the recording start time code about 130 times on a memory label with a capacity of 1 Kilobyte.

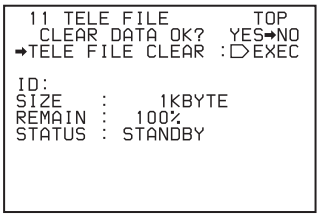
Note

When the remaining capacity of the memory label reaches 0%, you cannot record the recording start time code any more. "0%" is displayed on the REMAIN line and the message "MEMORY FULL" is displayed on the STATUS line.

3-4-5 Clearing Recorded Data

1 Follow steps **1** to **3** in *"Setting the Tele-File mark to be recorded for the first time after power on" (page 54)* to display the TELE FILE page of the FILE menu.

2 Turn the MENU knob to move the ➡ mark to TELE FILE CLEAR, then push the MENU knob.



The message "CLEAR DATA OK? YES NO" appears. In this case, the ➡ mark is displayed next to "NO" and "NO" blinks.

3 Turn the MENU knob to move the ➡ mark to YES ("YES" blinks), then push the MENU knob.

The data recorded on the memory label is cleared. 100 % appears on the REMAIN line.

Notes

- When the memory label is protected from accidental erasure, you cannot clear recorded data.
- The time code data is cleared. However, the memory label ID is not affected.

3-5 Freezing a Picture During Playback

Pressing the STOP button during playback stops playback and freezes the picture.
The VTR MODE page of the MAINTENANCE menu allows you to set the freeze-frame mode where you can view the frozen picture during playback.

Performing the settings required for freezing the picture

1 Follow steps **1** to **4** in *"Setting for recording good shot marks on the LTC-UBIT area on the tape" (page 39)* to display the VTR MODE page of the MAINTENANCE menu.

```
 10OVTR MODE

➡REC TALLY BLINK :●   ON
 REC START BEEP  :    OFF
 LCD DISPLAY HOLD: TIMER
 LCD HOLD TIMER  :    1H
 SHOT TIME DISP  :    MD
 VIDEO OUT(F/R)  :    EE
 STBY OFF TIMER  : 60MIN
 STOP KEY FREEZE :    OFF
```

2 Turn the MENU knob to move the ➡ mark to STOP KEY FREEZE, then push the MENU knob.

```
 10OVTR MODE

 REC TALLY BLINK :    ON
 REC START BEEP  :    OFF
 LCD DISPLAY HOLD: TIMER
 LCD HOLD TIMER  :    1H
 SHOT TIME DISP  :    MD
 VIDEO OUT(F/R)  :    EE
 STBY OFF TIMER  : 60MIN
●STOP KEY FREEZE :?  OFF
```

The ➡ mark on the left of STOP KEY FREEZE changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob clockwise or counterclockwise until the desired freeze mode appears.

The freeze mode changes in the following sequence:
OFF ⟷ FRAME ⟷ FIELD

Setting	Contents
OFF	Deactivates the freeze function.
FRAME	Freezes pictures in frame mode. This mode is effective for freezing pictures of objects that are not moving.
FIELD	Freezes pictures in field mode. This mode is effective for freezing moving pictures.

4 Push the MENU knob.

The ? mark on the left of the setting returns to a ● mark, and the ● mark on the left of STOP KEY FREEZE returns to an ➡ mark.

5 To end menu operation, set the MENU ON/OFF switch to OFF.

Viewing frozen pictures

1 Push the PLAY button to start playback.

2 Push the STOP button at the instant when you want to freeze the picture.

The tape stops running and the picture is frozen.
The time code is displayed in the counter display and the PLAY indicator flashes (one flash/second).

Changing to another mode

To cancel the freeze-frame mode for viewing the frozen picture and change to another mode, proceed as follows:

To restart playback: Push the PLAY button.
To search the color picture: Push the F FWD or REW buttons.
To view the pictures shot by the camcorder: Push the STOP button.
To rewind the tape: Push the REW button twice.
To fast forward the tape: Push the F FWD button twice.
To eject the tape: Push the EJECT button.

Notes

- In the freeze-frame mode, you cannot start recording pictures on the tape. To start recording the shot pictures again, push the STOP button to finish playback, then push the VTR START button.
- When changing to the recording pause mode from the freeze-frame mode by using the end-search function or positioning function for continuous recording, push the STOP button first, then push the RET button on the lens.

When remotely controlling the camcorder from an optional RM-B150/B750 Remote Control Unit

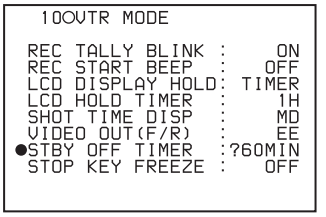
You can perform the same operation from an RM-B150/B750.

3-6 Setting the Stand-by off Timer During Rec-Pause

The VTR SAVE/STBY switch allows you to control the VTR power mode during pauses in recording (rec-pause) or when stopped.
However, even in the standby mode (with the VTR SAVE/STBY switch set to STBY), you can set the VTR in such a way that the mode is automatically switched from the standby mode to save mode when the tape does not run for a preset time, using the VTR MODE page of the MAINTENANCE menu.

1 Follow steps **1** to **4** in *"Setting for recording good shot marks on the LTC-UBIT area on the tape" (page 39)* to display the VTR MODE page of the MAINTENANCE menu.

2 Turn the MENU knob to move the ➧ mark to STBY OFF TIMER, then push the MENU knob.


10OVTR MODE
REC TALLY BLINK : ON
REC START BEEP : OFF
LCD DISPLAY HOLD: TIMER
LCD HOLD TIMER : 1H
SHOT TIME DISP : MD
VIDEO OUT(F/R) : EE
●STBY OFF TIMER :?60MIN
STOP KEY FREEZE : OFF

The ➧ mark on the left of STBY OFF TIMER changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob clockwise or counterclockwise until the desired STBY OFF TIMER appears.

When you turn the MENU knob clockwise or counterclockwise, STBY OFF TIMER changes in the following sequence: 60MIN ⟷ 30MIN ⟷ 10MIN ⟷ 5MIN ⟷ OFF.

In order not to enter in the VTR SAVE mode, select OFF.
To enter the VTR SAVE mode, select the desired time.

4 Push the MENU knob.

The ● mark on the left of STBY OFF TIMER returns to an ➧ mark, and the ? mark to the left of the setting returns to the ● mark.

5 To end menu operations, set the MENU ON/OFF switch to OFF.

Chapter 4 Adjustments and Settings for Recording

4-1 Adjusting the Black Balance and the White Balance

To ensure excellent image quality when using this camcorder, conditions may require that both the black balance and the white balance be adjusted.

Black balance adjustment

The black balance requires adjustment in the following cases.

- When the camcorder is used for the first time
- When the camcorder has not been used for a long time
- When the camcorder is used under conditions in which the surrounding temperature has changed greatly
- When the GAIN selector (L/M/H) values have been changed by using the USER menu

It is not usually necessary to adjust the black balance when using the camcorder after it has been off for a while.

White balance adjustment

Always readjust the white balance when the lighting conditions change.

Viewfinder screen displays

If the black balance or white balance adjustment is started, messages that report on the progress and results are displayed on the viewfinder screen when the VF DISP MODE item is set to "2" or "3" on the VF DISP 1 page of the USER menu.

For detailed information on the display mode, see "5-2-3 Display Modes and Setting Change Confirmation/ Adjustment Progress Messages" on page 85.

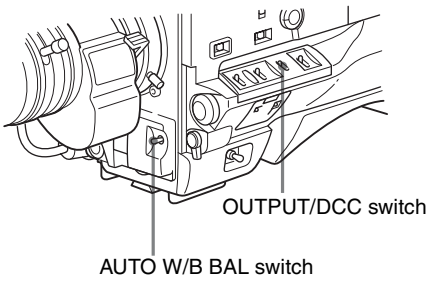
Note

Black balance and white balance adjustment values that are automatically set by the camcorder and the various settings are stored in the camcorder memory and retained even when the power is turned off.

4-1-1 Adjusting the Black Balance

Adjusting the black balance automatically

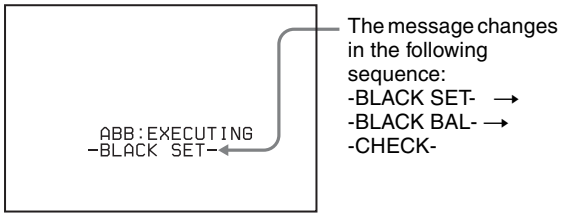
In automatic black balance mode, adjustments are performed in the following order: clamp level, black set, and black balance. Manual black balance adjustment can be selected from the setup menu.



1 Set the OUTPUT/DCC switch to CAM.

2 Push the AUTO W/B BAL switch to BLK and release the switch.

The switch returns to the center position, and the adjustment is executed.
During adjustment, the following message is displayed on the viewfinder screen.



The black balance adjustment ends in a few seconds with the message “ABB:OK” and the adjustment value is automatically stored in memory.

Notes

- During the black balance adjustment, the iris is closed automatically.
- During the black balance adjustment, the gain selection circuit is activated automatically; so you may see flickering on the viewfinder screen, but this is not a fault.

If automatic black balance adjustment cannot be made

If the black balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3). Possible messages are listed below.

Black balance adjustment error messages

Error message	Meaning
ABB : NG IRIS NOT CLOSED or OVER LEVEL	The lens iris did not close; adjustment was impossible.
ABB : NG TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
ABB : NG R (or G or B) : OVERFLOW	The difference between the reference value and the current value is so great that it exceeds the range. Adjustment was impossible.

If any of the above error messages is displayed, retry the black balance adjustment.
Keep pushing the AUTO W/B BAL to BLK until “-BLACK SET-” appears after “-BLACK BALANCE-” appears. If the error message occurs again, contact your Sony service representative.

Note

If the lens cable is not firmly connected to the LENS connector, it may not be possible to adjust the lens iris. If this happens, the black balance will be incorrect.

Black balance memory

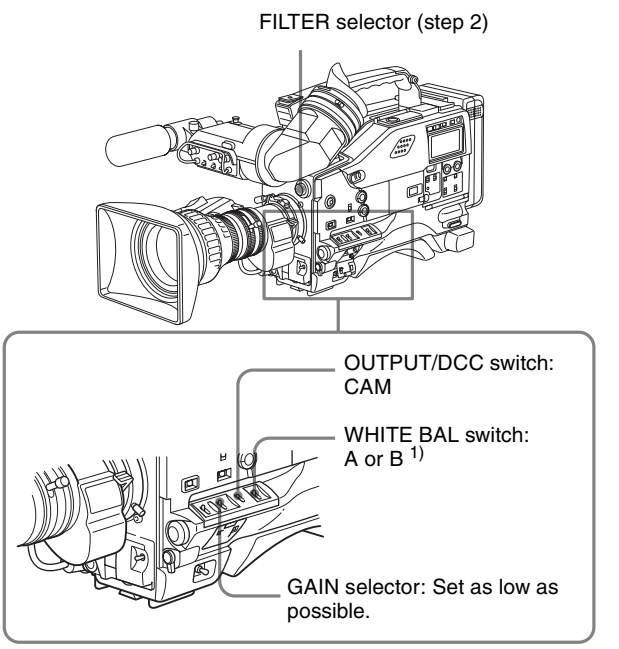
Values stored in memory are held until the black balance is adjusted again.

4-1-2 Adjusting the White Balance

Adjusting the white balance automatically

When you make automatic white balance adjustments, the adjustment value obtained is saved in memory.

1 Set the switches and selectors as shown in the following figure.



1) White balance setting values are stored in memory B only when the WHITE SWITCH <B> item is set to “MEM” on the FUNCTION 2 page of the OPERATION menu.

If the setting of the GAIN selector or WHITE BAL switch is changed, a message reporting the new setting position appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen.

2 Set the FILTER selector to suit the lighting conditions as follows:

FILTER selector (outer knob) setting and CC-filter selection

FILTER selector (outer knob) setting	CC filter
A	Cross filter
B	3200K
C	4300K
D	6300K

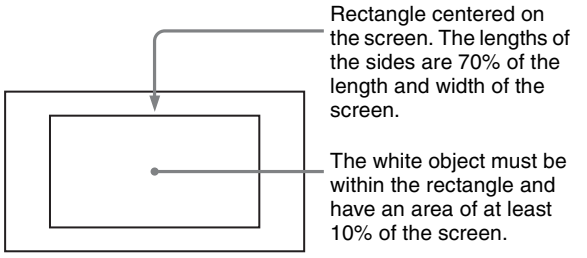
FILTER selector (inner knob) setting and ND-filter selection

FILTER selector (inner knob) setting	ND filter
1	Clear
2	1/4 ND
3	1/16 ND
4	1/64 ND

If the setting of the FILTER selector is changed, a message reporting the setting appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen (in display mode 3).

3 Place a white test card under the same lighting conditions as those for the subject to be shot and zoom in to it.

Alternatively, any white object such as a cloth or a wall can be used.
The absolute minimum white area is as follows:


Rectangle centered on the screen. The lengths of the sides are 70% of the length and width of the screen.
The white object must be within the rectangle and have an area of at least 10% of the screen.

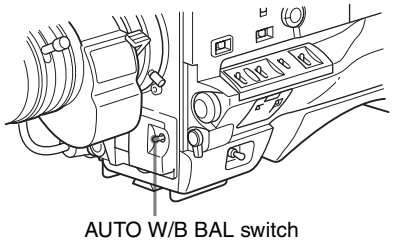
Note

Make sure there are no bright spots in the rectangle.

4 Adjust the lens iris.

Manually adjusted lens: Set the iris to an appropriate setting.
Lens with automatic iris: Set the automatic/manual switch on the lens to automatic.

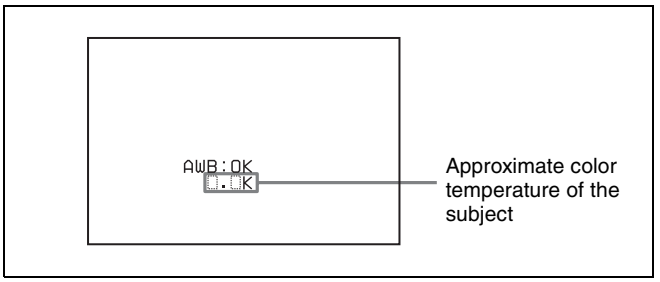
5 Push the AUTO W/B BAL switch to WHT and then release the switch.



The switch returns to the center position, and the adjustment is executed.

During adjustment, the message "AWB : EXECUTING" is displayed on the viewfinder screen (in display mode 2 or 3).

The white balance adjustment ends in about 1 second with the message shown in the following figure. The adjustment setting is automatically stored in the memory (A or B) that was selected in step **1** using the WHITE BAL switch.



Note

If the camera has a zoom lens with an automatic iris, the iris may hunt [1)] during the adjustment. To prevent this, adjust the iris gain knob (indicated as IG, IS, or S) on the lens.

1) Hunting
Repeated brightening and darkening of the image, resulting from repeated response to automatic iris control.

For details, refer to the lens operating manual of the lens.

If the automatic white balance adjustment cannot be made

If the white balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3). Possible messages are listed below.

White balance adjustment error messages

Error message	Meaning
AWB : NG LOW LEVEL	The white video level is too low. Either open the lens iris or increase the gain.
AWB : NG COLOR TEMP HIGH	The color temperature is too high. Select a suitable filter setting.
AWB : NG COLOR TEMP LOW	The color temperature is too low. Select a suitable filter setting.
AWB : NG TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
AWB : NG POOR WHITE AREA	The white area could not be checked.
AWB : NG OVER LEVEL	The white video level is too high. Either step down the lens iris or change the ND filter.

If any of the above error messages is displayed, retry the white balance adjustment. If the error message occurs again, contact your Sony service representative.

If you have no time to adjust the white balance

Set the WHITE BAL switch to PRST.
The white balance is automatically set as follows, depending on the FILTER selector setting.
A: Cross filter
B: 3200K
C: 4300K
D: 6300K

For details about setting the white balance automatically, see "Adjusting the white balance automatically" on page 60.

White balance memory

Values stored in memory are held until the white balance is adjusted again.
There are two sets of white balance memories, A and B, and adjustments for each of the filters can be automatically stored in the memory corresponding to the setting (A or B) of the WHITE BAL switch. The camcorder has four built-in filters, so a total of eight (4 × 2) adjustments can be stored.

The number of memories allocated to each of A and B can be limited to one without linking to the filter setting by setting WHT FILTER INH *(page 164)* to ON on the FUNCTION 3 page of the MAINTENANCE menu. In this case, adjustments for each of A and B are stored separately from the value when WHT FILTER INH *(page 164)* is set to OFF.

If the WHITE BAL switch is set to B, and on the FUNCTION 2 page of the OPERATION menu, the WHITE SWITCH <B> item is set to ATW, the ATW (Auto Tracing White) function is activated to automatically adjust the white balance of the picture being shot for varying lighting conditions.

4-2 Setting the Electronic Shutter

This section describes the shutter modes that can be used with the electronic shutter of the camcorder, and describes the procedure for selecting the shutter speed and shutter mode.

4-2-1 Shutter Modes

The shutter modes that can be used with the electronic shutter and the shutter speeds that can be selected are shown below.

Standard mode

Use this mode for shooting fast-moving subjects with little blurring.

Frame frequency	Shutter speed (sec.)
59.94i	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000
50i	1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000
25PsF	1/33, 1/50, 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000

ECS (Extended Clear Scan) mode

Use this mode for obtaining images with no horizontal bands of noise when shooting subjects such as monitor screens.

Frame frequency	Shutter speed
59.94i	30.00 to 4300 Hz
50i	25.00 to 4700 Hz
25PsF	25.00 to 2100 Hz

SLS (slow speed shutter) mode (with an optional HKDW-905R)

The SLS mode can only be selected when an optional HKDW-905R is installed in the camcorder.
Use this mode for shooting subjects in low level lighting conditions.
You can select the shutter speed from among 1 to 8, 16, 32, and 64 (1/30 to 1/4 sec, 1/2 sec, 1 sec, 2 sec).

EVS (Enhanced Vertical definition System) mode

This mode is used to improved vertical resolution. However, the sensitivity and dynamic range are reduced. This mode can be used together with the Standard or ECS mode.

Notes

- Whatever the operating mode of the electronic shutter, the sensitivity of the CCD decreases with increasing shutter speed.
- When automatic iris is used, the iris opens wider as the shutter speed increases, as a result reducing the depth of field.
- Under artificial light, particularly fluorescent or mercury lamps, the light intensity may appear to be constant, but the red, green, and blue intensities are actually changing in synchronization with the frequency of the power supply, causing flicker. Using an electronic shutter under such lighting could make the flicker even worse. Color flicker is particularly likely to happen when the power supply frequency is 60 Hz. However, if the power frequency is 50 Hz, setting the shutter speed to 1/100 can reduce this flicker.
- When a bright object is shot in EVS mode or ECS mode in such a manner that it fills the screen, the upper edge of the picture may have poor quality because of an inherent characteristic of CCDs. Before using EVS mode or ECS mode, check the shooting conditions.
- The EVS mode is not effective for 25PsF format.

You can turn the EVS mode on or off on the SW STATUS page of the PAINT menu (page 151).

4-2-2 Selecting the Shutter Mode and Shutter Speed

Use the SHUTTER selector to select a shutter mode or a standard-mode shutter speed. To set the shutter speed in ECS or SLS mode, with the SHUTTER selector set to ON and the ECS or SLS[1)] mode selected, use the MENU knob for adjustment.
You can use the SHT ENABLE page of the OPERATION menu to narrow the range of choice in advance, or to select in advance whether or not you use the ECS mode.

For details, see "Changing the range of choice of shutter mode and speed settings" on page 65.

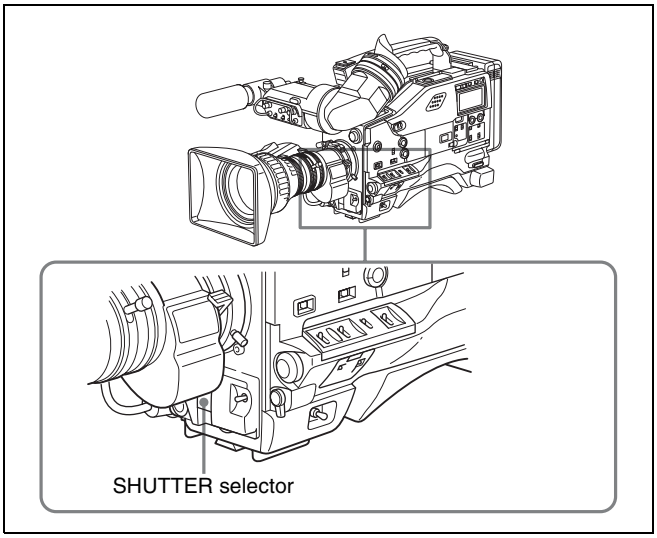
1) The SLS mode is effective only when an optional HKDW-905R is installed.

Setting the shutter mode and the shutter speed in standard mode

Once the shutter speed is selected, it is retained even when the camcorder power is turned off.

1 Follow the procedure described in *"5-2-2 Selecting Display Items" (page 84)* to set the VF DISP MODE item to "2" or "3" on the VF DISP 1 page of the USER menu.

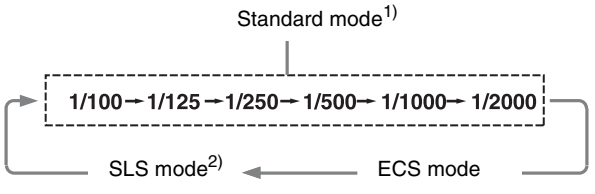
2 Push the SHUTTER selector from ON to SELECT.



The current shutter setting indication appears for about 3 seconds in the viewfinder screen.
Examples: ": SS : 1/250," ": ECS : 60.00 Hz"

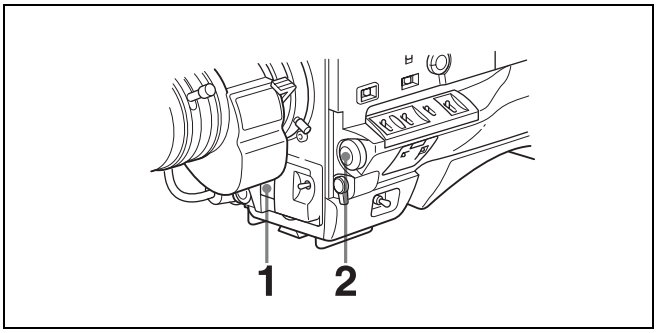
3 Before the shutter setting indication disappears, push the SHUTTER selector down to SELECT again and repeat this until the desired mode or speed appears.

Pushing the SHUTTER selector down to SELECT repeatedly allows you to cycle through the settings of mode and speed preselected on the SHT ENABLE page of the OPERATION menu.
Note that all modes and all standard-mode speeds listed in the table on the previous page are preselected using the SHT ENABLE page of the OPERATION menu.
By factory default, all available shutter modes and shutter speeds are displayed in the sequence shown in the following figure. (You can use the SHT ENABLE page of the OPERATION menu to make a setting so that only the desired – or most frequently used – modes and speeds are displayed.)



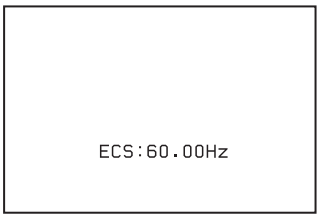
1) These shutter speeds in the standard mode are available for 59.94i format.
2) The SLS mode appears only when an optional HKDW-905R is installed in the camcorder.

Setting the shutter speed in ECS mode



1 Set the shutter speed mode to ECS.

Viewfinder screen when ECS is selected



2 Turn the MENU knob counterclockwise as seen from the front of the camera to increase the value, or clockwise to decrease the value, until the desired frequency appears.

For the frequency range, see the table in " ECS (Extended Clear Scan) mode" on page 62.

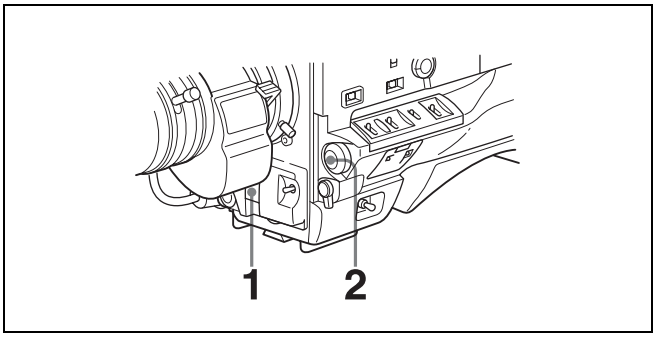
When the ECS mode has already been selected, the currently selected frequency is displayed by pushing the MENU knob. In this case, you can change the desired frequency only by turning the MENU knob.

When an optional RM-B150/B750 Remote Control Unit is connected

You can set the shutter speed of ECS with the rotary encoder of the RM-B150/B750.

Setting the shutter speed in SLS mode (with an HKDW-905R board installed)

Installing an optional HKDW-905R extension board enables the camcorder to have the Slow Shutter function, which provides ultra high sensitivity. The Slow Shutter function is useful not only for shooting in extremely dark conditions, but also for shooting moving objects with a special afterimage effect.
You can select the slow shutter speed from among 1 to 8, 16, 32, and 64.

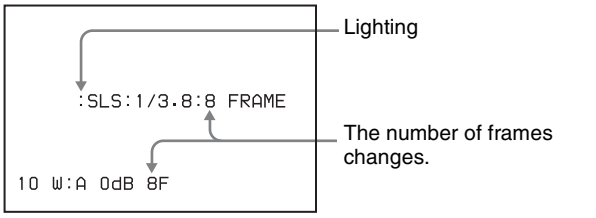


1 Set the shutter speed mode to SLS.

When the camcorder enters the SLS mode, ": SLS : 1/xx : **FRAME" appears.
"**" indicates the number of frames, and a number from 1 to 64 m the sequence described below is shown.

2 While ":" at the top of the current shutter is displayed, turn the MENU knob until the desired number of frames appears.

If you turn the MENU knob clockwise or counterclockwise, the number of frames changes in the following sequence: 1 ⟷ 2 ⟷ 3 ⟷ 4 ⟷ 5 ⟷ 6 ⟷ 7 ⟷ 8 ⟷ 16 ⟷ 32 ⟷ 64.



When SLS mode has already been selected, the currently selected number of frames is displayed by pushing the MENU knob. In this case, you can change the number of frames only by turning the MENU knob.

Note

You can change the number of frames only when ":" is lit. The number of frames once selected, is retained, even after the power of the camcorder is turned off.

Notes on using the SLS mode

- When the SLS mode is selected, the following items are limited in functionality.
  —AUTO IRIS
  The iris setting is locked to OPEN. Adjust the iris setting manually.
  —FLARE correction
  The setting of FLARE on the SW STATUS page of the PAINT menu is locked to OFF, regardless of the setting.
  —AWB
  The longer the exposure time, the longer the automatic white balance adjustment time is.

- The following are characteristics of a CCD. They are not malfunctions.
  - —If you select a large number of frames, white speckles may appear on the CCD.
  - —When you switch the shutter mode from SS mode to SLS mode, the picture may blur.
  - —When you switch the OUTPUT/DCC switch from BARS to CAM, the picture may blur (only when 50i format is selected).
  - —If a larger number of frames is selected in SLS mode in a high temperature situation, a flicker may appear on the picture.
  - —If you switch the GAIN selector position, noise may appear.

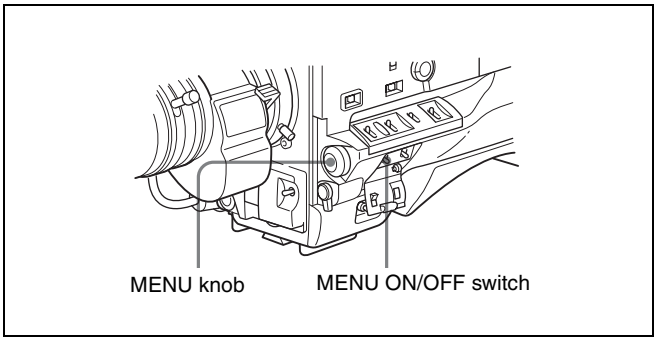
For detailed information, consult your Sony dealer.

Changing the range of choice of shutter mode and speed settings

You can reduce the time required to select whether you use the ECS mode and the speed by narrowing the choice of settings in advance. This can be done by using the SHT ENABLE page of the OPERATION menu.

Notes

- The SLS mode can be selected only when an optional HKDW-905R extension board is installed.
- When controlling the camcorder by connecting an optional Remote Control Unit such as RM-B150/B750, you can select all shutter speeds and ECS mode regardless of the setting on the SHT ENABLE page.



1 Set the MENU ON/OFF switch to ON while holding down the MENU knob.

The TOP menu appears.

```
      <TOP MENU>

➡USER
 USER MENU CUSTOMIZE
 ALL
 •OPERATION
 •PAINT
 •MAINTENANCE
 •FILE
 •DIAGNOSIS
```

2 Turn the MENU knob to move the ➡ mark to OPERATION.

3 Push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page of the OPERATION menu appears.
If the menu has been used before, the page accessed last appears.

4 If the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➡ mark to SHT ENABLE, then push the MENU knob to display the SHT ENABLE page.
If a different page is displayed, turn the MENU knob until the SHT ENABLE page appears, then push the MENU knob to select the page.

The current setting of each item appears to the right of the item.

```
  18OSHT ENABLE

➡SHUTTER ECS      :●   ON
 SHUTTER 1/100    :    ON
 SHUTTER 1/125    :    ON
 SHUTTER 1/250    :    ON
 SHUTTER 1/500    :    ON
 SHUTTER 1/1000   :    ON
 SHUTTER 1/2000   :    ON
```

5 Turn the MENU knob to move the ➡ mark to the shutter mode or shutter speed you want, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

6 Turn the MENU knob until ON appears, then push the MENU knob.

The ● mark on the left of the selected item returns to a ➡ mark and the ? mark on the left of the setting returns to a ● mark.
To set another mode or speed, return to step **5**.

Note that only the shutter speeds set to ON can be selected with the SHUTTER selector.

7 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu display disappears from the viewfinder screen and the display indicating the current status of the camcorder appears on the viewfinder screen.

Note

When you set “SHT DISP MODE” *(page 164)* to “DEG” on the FUNCTION 3 page of the MAINTENANCE menu, the shutter speed indications in seconds (e.g. 1/100) can be changed to degrees (360 is equivalent to shutter OFF).

4-3 Changing the Reference Value for Automatic Iris Adjustment

The reference value for automatic iris adjustment can be changed to aid the shooting of clear pictures of back-lit subjects, or to prevent blown-out highlights. The reference value for the lens iris can be set within the following range with respect to the standard value.

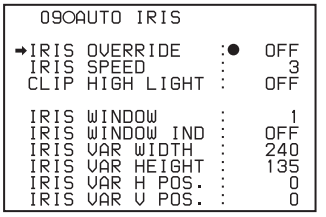
- 0.25: about 0.25 stop further open
- 0.5: about 0.5 stop further open
- 0.75: about 0.75 stop further open
- 1: about 1 stop further open
- –0.25: about 0.25 stop further closed
- –0.5: about 0.5 stop further closed
- –0.75: about 0.75 stop further closed
- –1: about 1 stop further closed

Changing the reference value

1 Set the MENU ON/OFF switch to ON.

The page accessed last appears.

2 Turn the MENU knob until the AUTO IRIS page appears, then push the MENU knob.


09 AUTO IRIS
➡IRIS OVERRIDE :● OFF
IRIS SPEED : 3
CLIP HIGH LIGHT : OFF
IRIS WINDOW : 1
IRIS WINDOW IND : OFF
IRIS VAR WIDTH : 240
IRIS VAR HEIGHT : 135
IRIS VAR H POS. : 0
IRIS VAR V POS. : 0

3 Turn the MENU knob to move the ➡ mark to IRIS OVERRIDE, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob until ON appears, then push the MENU knob.

The ● mark on the left of the selected item returns to a ➡ mark and the ? mark on the left of the setting returns to a ● mark.
The IRIS OVERRIDE item is set to ON (factory setting: OFF).

5 Set the MENU ON/OFF switch to OFF.

The AUTO IRIS page disappears from the viewfinder screen.

6 Turn the MENU knob to change the reference value.

Note

When you push the MENU knob in ECS or SLS[1)] mode, the camcorder enters a mode where you can change the frequency in the ECS mode or the number of frames in the SLS mode by turning the MENU knob.

1)The SLS mode is effective only when an optional HKDW-905R extension board is installed in the camcorder.

The changed reference value is retained until the power of the camcorder is turned off.
Even if the reference value is changed, it reverts to the standard value every time the power is turned on.

To open the iris by 0.25 stop:

Turn the MENU knob further counterclockwise as seen from the front of the camera.
One bar (☐) appears in the upper part to the left of the F number in the iris indication.

To open the iris by 0.5 stop:

Turn the MENU knob further counterclockwise as seen from the front of the camera.
One bar (■) appears in the upper part to the left of the F number in the iris indication.

To open the iris by 0.75 stop:

Turn the MENU knob further counterclockwise as seen from the front of the camera.
Two bars (☐■) appear in the upper part to the left of the F number in the iris indication.

To open the iris by 1 stop:

Turn the MENU knob counterclockwise as seen from the front of the camera.
Two bars (■■) appear in the upper part to the left of the F number in the iris indication.

To close the iris by 0.25 stop:

Turn the MENU knob clockwise as seen from the front of the camera.
One bar (☐) appears in the lower part to the left of the F number in the iris indication.

To close the iris by 0.5 stop:

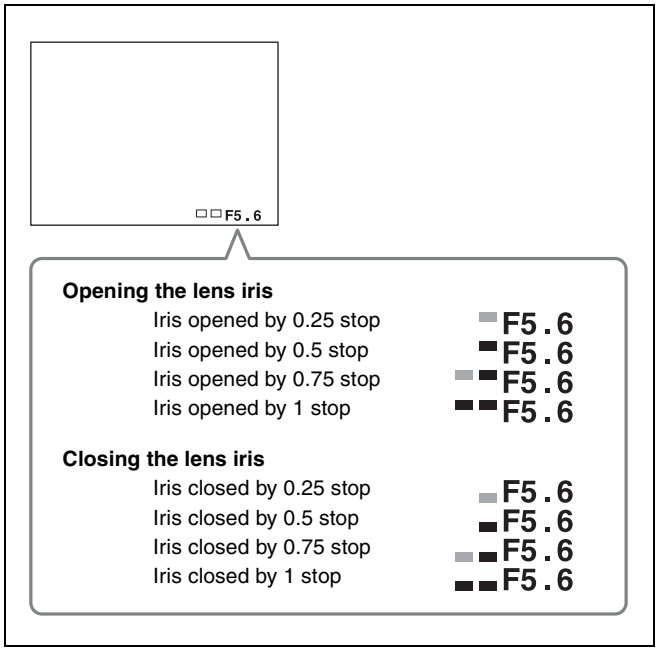
Turn the MENU knob clockwise as seen from the front of the camera.
One bar (■) appears in the lower part to the left of the F number in the iris indication.

To close the iris by 0.75 stop:

Turn the MENU knob clockwise as seen from the front of the camera.
Two bars (□■) appear in the lower part to the left of the F number in the iris indication.

To close the iris by 1 stop:

Turn the MENU knob clockwise as seen from the front of the camera.
Two bars (■■) appear in the lower part to the left of the F number in the iris indication.



When an optional RM-B150/B750 Remote Control Unit is connected

The IRIS control knob of the RM-B150/B750 can be used for lens iris setting. In this case, the bar display (□) does not appear.

Selecting the automatic iris window

1 Follow steps **1** and **2** in "Changing the reference value" *(page 66)* to display the AUTO IRIS page.

2 Turn the MENU knob to move the ➧ mark to IRIS WINDOW IND, then push the MENU knob.

The ➧ mark on the left of IRIS WINDOW IND changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob until ON appears, then push the MENU knob.

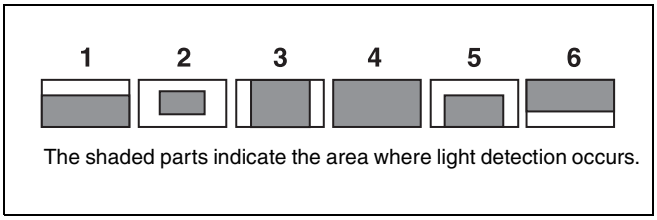
The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.
The currently selected auto iris window appears on the screen.

If it is not necessary to display the auto iris window on the viewfinder screen, set it to "OFF."

4 Turn the MENU knob to move the ➧ mark to IRIS WINDOW, then push the MENU knob.

The ➧ mark changes to a ● mark, and the ● mark changes to a ? mark.

5 Turn the MENU knob until the desired auto iris window appears, then push the MENU knob.



Auto iris window

The ● mark returns to a ➧ mark and the ? mark returns to a ● mark.

If you select "VAR," the following items become effective and you can set the window to the desired size. Set each item to the desired size.

Item	Setting
IRIS VAR WIDTH	The width of the window
IRIS VAR HEIGHT	The height of the window
IRIS VAR H POS.	The position of the window in the horizontal direction
IRIS VAR V POS.	The position of the window in the vertical direction

6 Set the MENU ON/OFF switch to OFF.

The menu display disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the screen.

Countering problems with very bright highlights

If the subject is too bright, the iris may close too much, leaving the overall image dark, or the highlights may be blown out. In such cases, setting the highlight clip function to ON reduces the luminance range, avoiding problems from the automatic iris correction.
In the AUTO IRIS page of the USER menu, set the CLIP HIGH LIGHT item to ON.

4-4 Adjusting the Audio Level

Setting the AUDIO SELECT CH-1/CH-2 switches to AUTO automatically adjusts the input levels of the audio signal to be recorded in audio channels 1 and 2. You can also adjust the audio level manually.

For the audio level of the signal to be recorded in audio channels 3 and 4

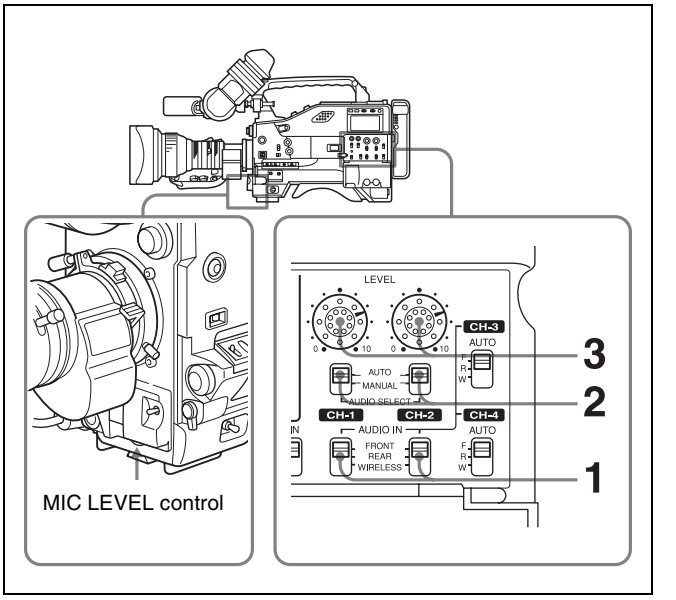
The input levels of audio channels CH-3 and CH-4 are automatically adjusted. Also, you can adjust them manually by setting AUDIO SELECT CH3 and/or AUDIO SELECT CH4 to MANU on the AUDIO 3 page of the MAINTENANCE menu.
When the CH-1/2 / CH-3/4 switch is set to CH-3/4, the audio channel level meters display the level of the audio signals recorded in audio channels CH-3 and CH-4. You can select the audio input signals to be recorded for audio channel CH-3 and CH-4 by using the AUDIO IN CH-3/ CH-4 switches.

4-4-1 Manually Adjusting the Audio Input Level of the AUDIO IN CH-1/ CH-2 Connectors

Use the following procedure to adjust the audio levels of the audio input from the AUDIO IN CH-1/CH-2 connectors, which are to be recorded in audio channels CH-1 and CH-2.

Note

When [1] and [2] are not displayed under the audio channel level meters, the CH-1/2/ CH-3/4 switch is set to the CH-3/4 position. Set this switch to CH-1/2.



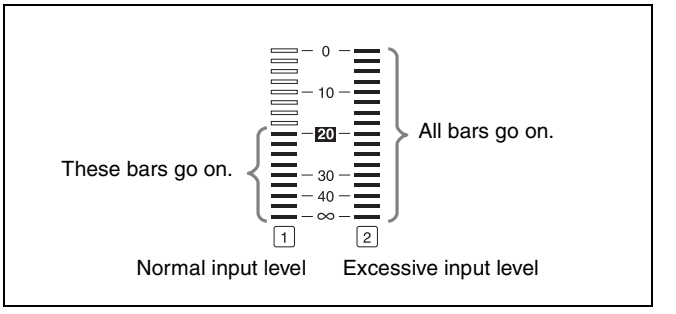
1 Set either or both of the AUDIO IN switches to REAR as follows.

When adjusting the signals of audio channels 1 and 2 input to AUDIO IN CH1/AUDIO IN CH2 connectors: Set both switches to REAR.
When adjusting the signal of either audio channel 1 or 2 input to AUDIO IN CH1 or AUDIO IN CH2 connector: Set the AUDIO IN switch corresponding to the signal to be adjusted to REAR.

2 Set the AUDIO SELECT switch(es) corresponding to the channel(s) selected in step **1** to MANUAL.

3 With the LEVEL control for the channel selected in step **1**, adjust so that the audio level meter shows up to –20 dB for a normal input volume.

The second bar from the top may turn on occasionally, but do not allow the top bar (0 dB) to go on. If it goes on, the audio level is too high.



Relationships between recording levels and level controls

You can select the audio level controls to be used to adjust the level of the audio signals input to the AUDIO IN CH-

1/CH-2 connectors using REAR1/WRR LEVEL *(page 160)* and REAR2/WRR LEVEL *(page 160)* on the AUDIO-3 page of the MAINTENANCE menu.

	The factory setting	Example 1	Example 2
Audio level to CH-1	LEVEL (CH-1) control	MIC LEVEL control	The MIC LEVEL control is linked with LEVEL (CH-1) control.
Audio level to CH-2	LEVEL (CH-2) control	MIC LEVEL control	The MIC LEVEL control is linked with LEVEL (CH-2) control.

Note

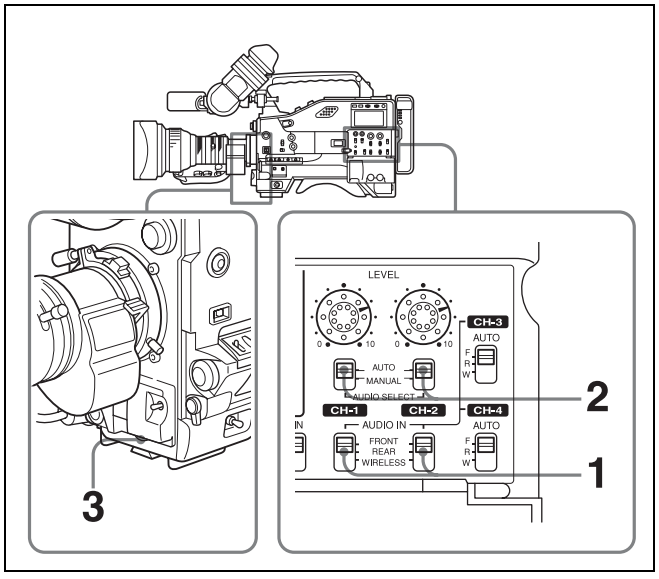
When you have operation of the LEVEL (CH-1/CH-2) controls and MIC LEVEL control linked together, if the MIC LEVEL control is set to 0, the audio signals on channels 1 and 2 cannot be recorded. Check the position of the MIC LEVEL control before adjusting the LEVEL (CH-1/CH-2) controls.

4-4-2 Manually Adjusting the Audio Level of the Front Microphone

You can adjust the audio level input from the front microphone connected to the MIC IN connector, which is to be recorded on audio channels 1 and 2.

Note

When 1 and 2 are not displayed under the audio channel level meters, the CH-1/2 / CH-3/4 switch is set to the CH-3/4 position. Set this switch to CH-1/2.



1 **To record stereo sound:** Set both AUDIO IN CH-1 and CH-2 switches to FRONT.

To record monaural sound: Set the appropriate AUDIO IN CH-1 or CH-2 switch corresponding to the channel to which you want to record and adjust the monaural sound signal to FRONT.

For detailed information on stereo or monaural recording, see "Recording stereo sound" on page 123.

2 Set the AUDIO SELECT switch(es) for the desired channel(s) selected in step **1** to MANUAL.

3 Turn the MIC LEVEL control, and adjust it so that the audio level meter shows up to –20 dB for a normal input volume.

- The 9 bars from the bottom among the 17 bars go on with the normal input volume.
- The second top bar may turn on occasionally, but do not allow the top bar to go on. If it goes on, the audio level is too high.

Note

Even if a stereo microphone is connected, you cannot adjust the levels of the L channel and R channel separately.

Relationships between recording levels and level controls

You can select the audio level controls to be used to adjust the level of the front microphone using MIC CH1 LEVEL *(page 160)* and MIC CH2 LEVEL *(page 160)* on the AUDIO-3 page of the MAINTENANCE menu.

	The factory setting	Example 1	Example 2
Audio level to CH-1	MIC LEVEL control	LEVEL (CH-1) control	The MIC LEVEL control is linked with LEVEL (CH-1) control.
Audio level to CH-2	MIC LEVEL control	LEVEL (CH-2) control	The MIC LEVEL control is linked with LEVEL (CH-2) control.

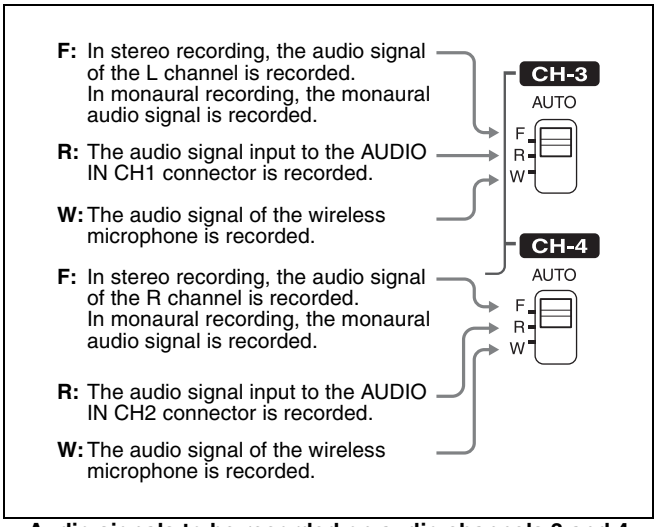
Note

When you have operation of the MIC LEVEL control and LEVEL (CH-1/CH-2) controls linked together, if the LEVEL (CH-1/CH-2) controls are set to 0, the audio signals on channels 1 and 2 cannot be recorded. Check the position of the LEVEL (CH-1/CH-2) controls before adjusting the MIC LEVEL control.

4-4-3 Input Level of Audio Channels CH-3 and CH-4

Selecting the audio input signals to be recorded

You can select the audio input signal to be recorded for audio channels CH-3 and CH-4 by using the AUDIO IN CH-3/CH-4 switches.


F: In stereo recording, the audio signal of the L channel is recorded. In monaural recording, the monaural audio signal is recorded.
R: The audio signal input to the AUDIO IN CH1 connector is recorded.
W: The audio signal of the wireless microphone is recorded.
F: In stereo recording, the audio signal of the R channel is recorded. In monaural recording, the monaural audio signal is recorded.
R: The audio signal input to the AUDIO IN CH2 connector is recorded.
W: The audio signal of the wireless microphone is recorded.
CH-3
AUTO
F
R
W
CH-4
AUTO
F
R
W

Audio signals to be recorded on audio channels 3 and 4

Adjusting the audio recording level

Note

When 1 and 2 are displayed under the audio channel level meters, the CH-1/CH-2 /CH-3/CH-4 switch is set to CH-1/2. Set this switch to CH-3/4.

You can adjust the input level of audio channels CH-3 and CH-4 by using the AUDIO SELECT CH3, AUDIO SELECT CH4, LVL CONTROL CH3 and LVL CONTROL 4 items on the AUDIO-3 page of the MAINTENANCE menu.

1 Set the MENU ON/OFF switch to ON while pushing the MENU knob.

The TOP menu appears.

2 Turn the MENU knob to move the ➧ mark to MAINTENANCE, then push the MENU knob.

When the MAINTENANCE menu is used for the first time, the CONTENTS page appears.

Or, if you have used the MAINTENANCE menu before, the page that was on the screen when the last menu operation ended appears.

3 When the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➧ mark to AUDIO-3, then push the MENU knob again.

When any page of the MAINTENANCE menu is displayed, turn the MENU knob until the AUDIO-3 page appears, then push the MENU knob.
The AUDIO-3 page appears.

```
  07 AUDIO-3

➧AU SG (1KHz)     :●  OFF
 MIC CH1 LEVEL    : FRONT
 MIC CH2 LEVEL    : FRONT
 REAR1/WRR LEVEL  : SIDE1
 REAR2/WRR LEVEL  : SIDE2

 AUDIO SELECT CH3:  AUTO
 AUDIO SELECT CH4:  AUTO
 LVL CONTROL CH3 :    70
 LVL CONTROL CH4 :    70
```

4 Select the method to be used to adjust the audio input level of audio channels CH-3 and CH-4.

To adjust the audio input level automatically

① Turn the MENU knob to move the ➧ mark to the channel to be adjusted automatically, then push the MENU knob.

```
  07 AUDIO-3

 AU SG (1KHz)     :   OFF
 MIC CH1 LEVEL    : FRONT
 MIC CH2 LEVEL    : FRONT
 REAR1/WRR LEVEL  : SIDE1
 REAR2/WRR LEVEL  : SIDE2

●AUDIO SELECT CH3:? AUTO
 AUDIO SELECT CH4:  AUTO
 LVL CONTROL CH3 :    70
 LVL CONTROL CH4 :    70
```

When adjusting the audio input level of audio channel 3

② Turn the MENU knob to display AUTO, then push the MENU knob.

To adjust the audio input level manually

① Turn the MENU knob to move the ➧ mark to the channel to be adjusted manually, then push the MENU knob.

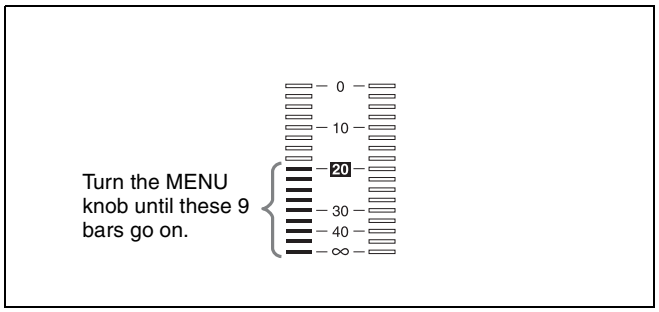
```
  07 AUDIO-3

 AU SG (1KHz)     :   OFF
 MIC CH1 LEVEL    : FRONT
 MIC CH2 LEVEL    : FRONT
 REAR1/WRR LEVEL  : SIDE1
 REAR2/WRR LEVEL  : SIDE2

●AUDIO SELECT CH3:? MANU
 AUDIO SELECT CH4:  AUTO
 LVL CONTROL CH3 :    70
 LVL CONTROL CH4 :    70
```

When adjusting the audio input level of audio channel 3

② Turn the MENU knob to display MANU, then push the MENU knob.

③ Turn the MENU knob to move the ➧ mark to LVL CONTROL CH3, then push the MENU knob.

④ Turn the MENU knob until the audio level meter shows up to -20 dB for a normal input volume.



You can adjust the audio input level between 0 and 100. For normal input volume, 9 bars from the bottom turn on. When the top bar (0 dB) turns on, the audio input level is too high. When the second bar from the top turns on occasionally, this is allowed.

⑤ Push the MENU knob.
The audio input level of audio channel 3 is set to the level adjusted in step ④.

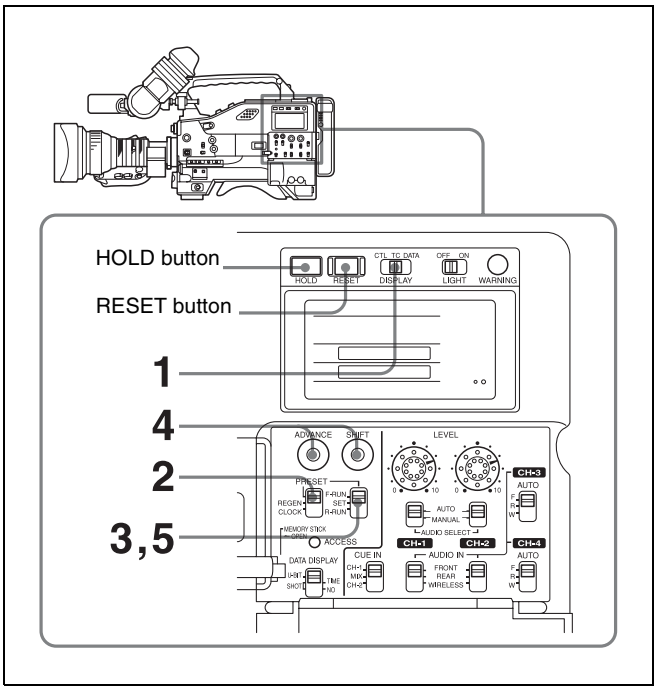
Adjust the audio input level of audio channel 4 similarly.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

4-5 Setting the Time Data

4-5-1 Setting the Time Code

The time code setting range is from 00 : 00 : 00 : 00 to 23 : 59 : 59 : 29 (hours : minutes : seconds : frames).



1 Set the DISPLAY switch to TC.

2 Set the PRESET/REGEN/CLOCK switch to PRESET.

3 Set the F-RUN/SET/R-RUN switch to SET.

The first (leftmost) digit of time code flashes.

4 Using the SHIFT and ADVANCE buttons, set the time code.

SHIFT: Selects a digit to set. Each time you press the button, the flashing digit moves one column to the right.
Pressing this button while holding down the HOLD button moves the flashing digit one column to the left.

ADVANCE: Increments the value of the flashing digit.
Pressing this button while holding down the HOLD button decrements the flashing digit.

To reset the time code value to 00:00:00:00

Press the RESET button.

5 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.

F-RUN: Free run. The time code generator keeps running.
R-RUN: Recording run. The time code generator runs only while recording.

To set drop frame mode/non-drop frame mode

You can select the drop frame (DF) mode or non-drop frame (NDF) mode on the FUNCTION 1 page *(page 145)* of the OPERATION menu or on the TIMECODE page *(page 161)* of the MAINTENANCE menu.

Note

This function is effective only when the 59.94i frame frequency is selected.

To make the time code consecutive

When the F-RUN/SET/R-RUN switch is set to R-RUN, recording a number of scenes on the tape normally produces consecutive time code. However, once you remove the tape and record on another tape, the time code will no longer be contiguous when you use the original tape again for recording. In this case, to make the time code consecutive, proceed as follows:

1 Set the PRESET/REGEN/CLOCK switch to REGEN.

2 Use the PLAY button to play back.

3 Watching the playback, find the point of the previous recording on the tape from which you wish to continue recording, then push the STOP button.

4 Press the RET button on the lens.

This reads the previous recording and synchronizes the internal time code generator, as a result allowing the new time code recorded to continue consecutively.

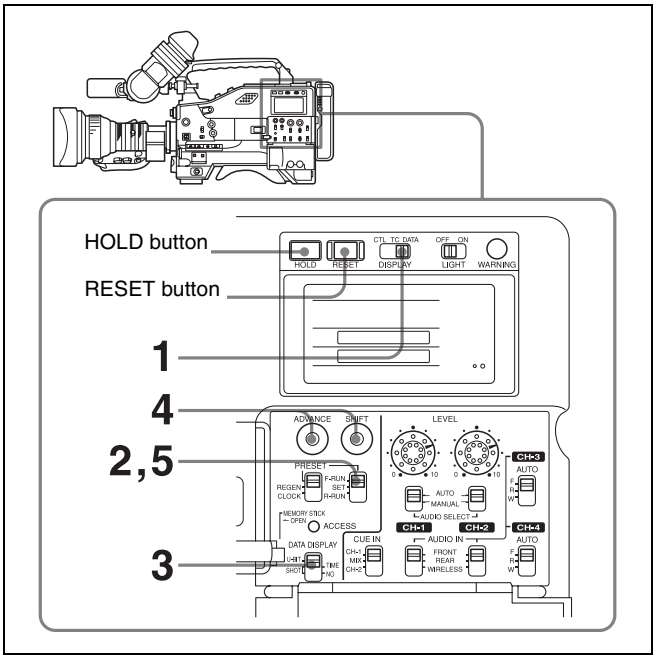
4-5-2 Saving the Actual Time in the Time Code

Setting the PRESET/REGEN/CLOCK switch to CLOCK saves the actual time in the time code.
When it is necessary to set the actual time, use the TIME/DATE page of the DIAGNOSIS menu.

For details, see "5-3-6 Setting the Date/Time of the Internal Clock" on page 98.

4-5-3 Setting the User Bits

By setting the user bits (up to 8 hexadecimal digits), you can record user information such as the date, time, or scene number on the time code track.



1 Set the DISPLAY switch to DATA.

2 Set the F-RUN/SET/R-RUN switch to SET.

3 Set the DATA DISPLAY switch to U-BIT.

4 Set the user bits by using the SHIFT and ADVANCE buttons.

SHIFT: Selects a digit to set. Each time you press the button, the flashing digit moves one column to the right. Pressing this button while holding down the HOLD button moves the flashing digit one column to the left.
ADVANCE: Increments the value of the flashing digit. Pressing this button while holding down the HOLD button decrements the flashing digit.

Hexadecimal digits A to F are displayed as follows:

Hexadecimal	A	B	C	D	E	F
Display	A	b	C	d	E	F

To reset the user bit data to 00:00:00:00

Press the RESET button.

5 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN, corresponding to the desired operating mode for the time code generator.

The user bit data set will be recorded for both LTC and VITC.

Storing the user bit setting in memory

The user bit setting (apart from the real time) is automatically retained in memory even when the power is turned off.

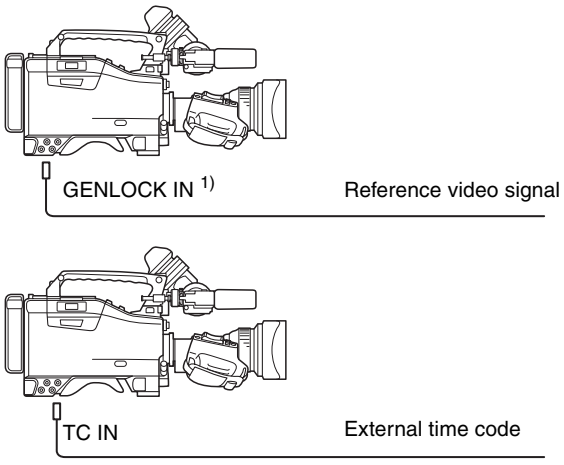
4-5-4 Synchronizing the Time Code

You can synchronize the internal time code generator of this camcorder with an external generator for the regeneration of an external time code. You can also synchronize the time code generators of other camcorders/ VTRs with the internal generator of this camcorder.

Connections for time code synchronization

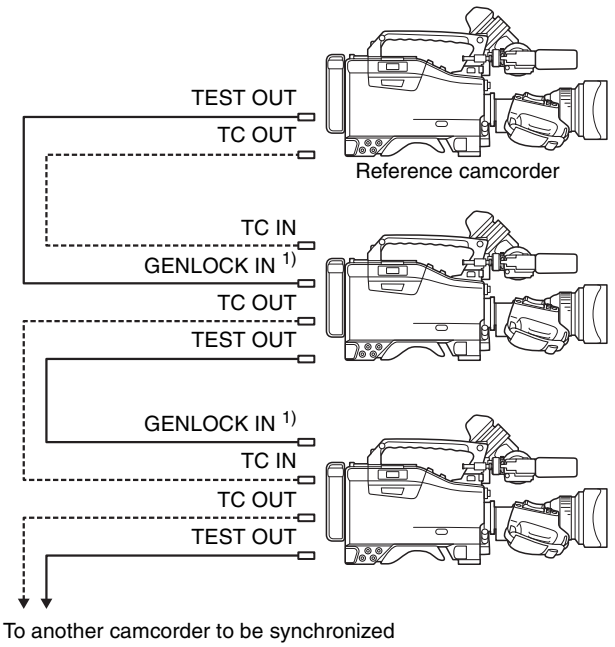
Connect both the reference video signal and the external time code as illustrated below.

Example 1: Synchronizing with an external time code



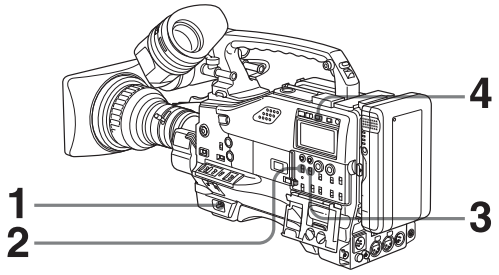
1) Set GENLOCK to ON on the GENLOCK page *(page 164)* of the MAINTENANCE menu, if GENLOCK is set to OFF.

Example 2: Interconnecting a number of camcorders for time code synchronization



1) Set GENLOCK to ON on the GENLOCK page *(page 164)* of the MAINTENANCE menu, if GENLOCK is set to OFF.

Procedure for time code synchronization



1 Set the POWER switch to ON.

2 Set the PRESET/REGEN/CLOCK switch to PRESET.

3 Set the F-RUN/SET/R-RUN switch to F-RUN.

4 Set the DISPLAY switch to TC.

5 Supply a time code signal and a reference video signal complying with the SMPTE standard to the TC IN connector and to the GENLOCK IN connector, respectively.

This operation synchronizes the internal time code generator with the external time code. After about 10 seconds, you can disconnect the external time code

without losing the synchronization. However, there will be noise on the recorded image if you connect or disconnect the time code signal during recording.

Notes

- When you finish the above procedure, the internal time code is immediately synchronized with the external time code and the counter display will show the value of the external time code. However, wait for a few seconds until the sync generator stabilizes before recording.
- If the frequency of the reference video signal is not the same as the frame frequency of the camcorder, the camcorder neither can be correctly genlocked nor can operate correctly. In such a case, the internal time code is not correctly synchronized with the external time code.
- When the GENLOCK ON/OFF item is set to OFF on the GENLOCK page of the MAINTENANCE menu *(page 164)*, the time code cannot be synchronized with the reference video signal. In this case, set the GENLOCK item to ON on the GENLOCK page of the MAINTENANCE menu.

User bit settings during time code synchronization

When the time code is synchronized, only the time data is synchronized with the external time code value. Therefore, the user bits can have their own settings for each camcorder.
To synchronize the user bits with external user bit data, set the EXT-LK UBIT item on the TIMECODE page *(page 161)* of the MAINTENANCE menu to EXT.

To release the time code synchronization

First disconnect the external time code, then set the F-RUN/SET/R-RUN switch to R-RUN.

To change the power supply from the battery pack to an external power supply during time code synchronization

To maintain a continuous power supply, connect the external power supply to the DC IN connector before removing the battery pack. You may lose time code synchronization if you remove the battery pack first.

Camera synchronization during time code synchronization

During time code synchronization, the camera is genlocked to the reference video signal input from the GENLOCK IN connector.

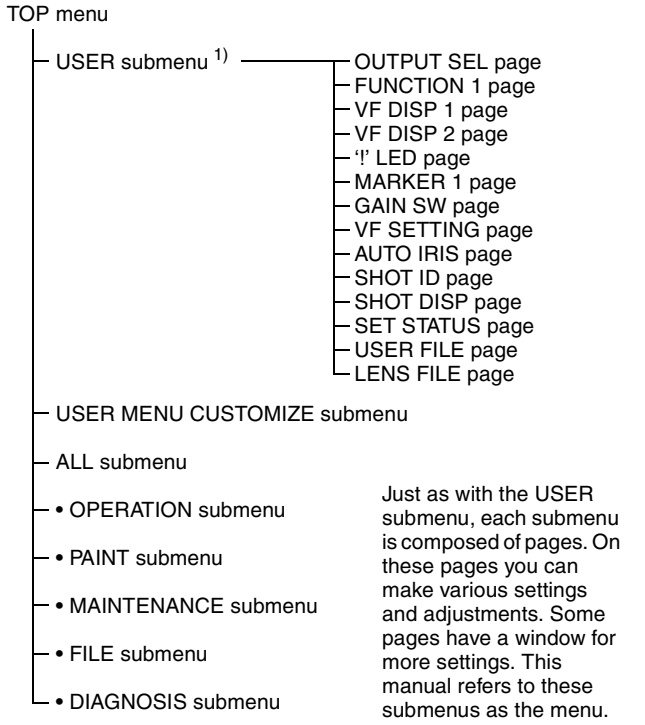
Chapter 5 Menu Displays and Detailed Settings

5-1 Menu Organization and Operation

The page number displayed on the top line of the menu may be different if an optional extension board is installed.

5-1-1 Menu Organization

The following shows the organization of menus that you can use to make various settings and adjustments.


TOP menu
USER submenu 1)
OUTPUT SEL page
FUNCTION 1 page
VF DISP 1 page
VF DISP 2 page
'!' LED page
MARKER 1 page
GAIN SW page
VF SETTING page
AUTO IRIS page
SHOT ID page
SHOT DISP page
SET STATUS page
USER FILE page
LENS FILE page
USER MENU CUSTOMIZE submenu
ALL submenu
• OPERATION submenu
• PAINT submenu
• MAINTENANCE submenu
• FILE submenu
• DIAGNOSIS submenu
Just as with the USER submenu, each submenu is composed of pages. On these pages you can make various settings and adjustments. Some pages have a window for more settings. This manual refers to these submenus as the menu.

1) In this manual, the USER menu consisting of items and pages registered at the factory is used. You can use the USER MENU CUSTOMIZE menu to add or delete pages according to how the camcorder is being used.

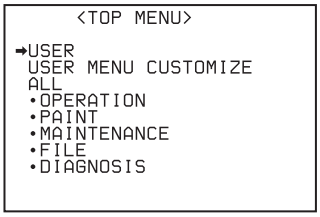
For details, see "5-1-3 Editing the USER Menu" on page 78.

TOP menu

The menus of the camcorder are composed of submenus classified into categories according to the frequency of use, purpose of use and so on. The TOP menu allows you to select the desired submenus.

To display TOP menu screen

While holding down the MENU knob, set the MENU ON/OFF switch from the OFF position to the ON position.



Note

Depending on the internal switch settings, display of the TOP menu may be disabled.

For details, ask your Sony service representative.

Submenus selected in the TOP menu

The following menus can be selected from the TOP menu.

• USER menu

This menu includes monitor output settings, viewfinder settings, and commonly used functions. This menu is normally displayed when the MENU ON/OFF switch is changed to ON.

• USER MENU CUSTOMIZE menu

This menu allows you to add pages to or delete pages from the USER menu to suit your needs.
You can add or delete menu items on the USER 1 to USER 19 pages. Also, you can add functions to be assigned to the assignable switches (UA01 to UA10).

• ALL menu

This menu contains all the items of the OPERATION menu, PAINT menu, MAINTENANCE menu, FILE menu and DIAGNOSIS menu.

• OPERATION menu

This menu contains items for changing settings according to conditions related to the subject when the camcorder is being operated.

• PAINT menu

This menu contains items for making detailed image adjustments while using a waveform monitor to monitor the waveforms output by the camera. Support of a video engineer is usually required to use this menu. Although you can also use an external remote control panel or master setup unit to set the items on this menu, this menu is effective when using the camcorder by itself outdoors.

• MAINTENANCE menu

This menu contains items for performing camera maintenance operations, such as changing the system, or using infrequently used “paint” items.

• FILE menu

This menu is for performing file operations, such as writing the reference file.

• DIAGNOSIS menu

This menu enables you to confirm the VTR status or identify a failed circuit board.

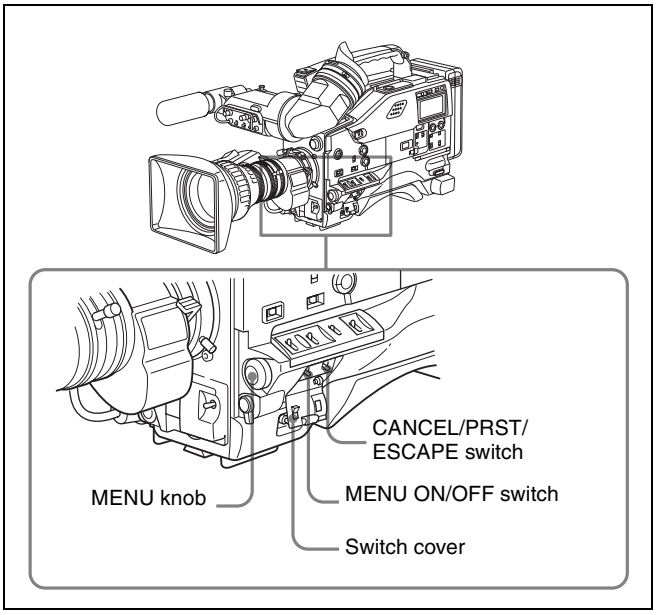
Returning to the TOP menu from other menus

There are two methods for returning to the TOP menu.

- Align the ➡ mark with “TOP” at the top right of the menu page, then push the MENU knob.
  TOP will always be displayed at the top right of the menu page once following setting is made: while holding the MENU knob, set the MENU ON/OFF switch to ON to display the TOP menu.
- Push the CANCEL/PRST / ESCAPE switch down to the ESCAPE position repeatedly until the TOP menu appears.

5-1-2 Basic Menu Operations

When you open the cover of the menu operating section, the MENU ON/OFF switch appears. If the MENU ON/OFF switch is set to ON, the menu is displayed on the viewfinder screen. Closing the cover automatically sets the MENU ON/OFF switch to OFF.



This section explains operations on the USER menu as an example. Operations for other menus are the same as those on the USER menu. Also, if optional extension boards are not installed in your camcorder, some items on the USER menu pages are not displayed.

1 Set the MENU ON/OFF switch to ON.

A USER menu page normally appears.
When the USER menu has been used before, the page accessed last appears. In this case, go to step **2**.

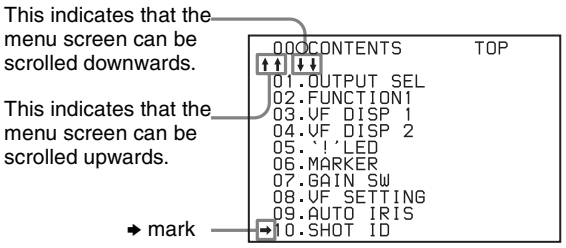
Example:

```
?03OFUNCTION1

 ASSIGN SW <1>    :    ATW
 ASSIGN SW <2>    :    OFF
 TURBO SW         :  TURBO
 FRONT MIC SELECT: STREO
 DF/NDF           :     DF
 END SEARCH       :    OFF
 CACHE/INTVAL REC:    OFF
```

When this is the first time the USER menu has been displayed, the CONTENTS page of the USER menu appears. In this case, follow the procedure below.

Or, you can access the desired page from the CONTENTS page by going to step **2** instead of performing the operations in steps ① and ②.

① Push the MENU knob once, then turn the MENU knob to move the ➡ mark to the desired page number.



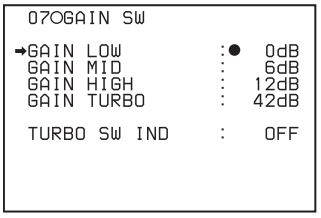
② Push the MENU knob.

The selected page is displayed.
Go to step **4**.

2 Turn the MENU knob until the desired page appears.

3 Push the MENU knob.

A ➡ mark appears on the left of the item currently selected on the page.

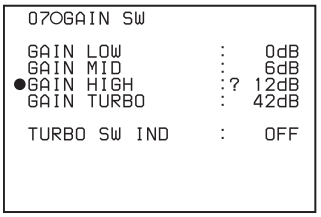


4 Turn the MENU knob to move the ➡ mark to the desired item.

- Turning the MENU knob counterclockwise as seen from the front of the camera moves the ➡ mark up continuously.
- Turning the MENU knob clockwise as seen from the front of the camera moves the ➡ mark down continuously.

5 Push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.
The menu display changes to the setting screen where you can change the settings.



6 Turn the MENU knob to change the setting.

To increase a setting value

Turn the MENU knob counterclockwise as seen from the front of the camera.

To decrease a setting value

Turn the MENU knob clockwise as seen from the front of the camera.
When you turn the MENU knob, the setting increases or decreases one step at a time.
If you turn the knob quickly, the numeric value changes rapidly. If you turn it slowly, you can make minor adjustments.

To toggle a setting on or off

Turn the MENU knob clockwise or counterclockwise. Each turning operation of the knob toggles the ON and OFF settings.

To cancel the setting/to reset the setting to the initial setting

You can cancel the setting and reset it to its initial value (one set at the factory, or a preset value) by pushing the CANCEL/PRST / ESCAPE switch to CANCEL/PRST before pushing the MENU knob in step **7**.

① Set the CANCEL/PRST / ESCAPE switch to CANCEL/PRST.

The message “CANCEL DATA OK?” appears.

② **To cancel the previous setting:** Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST.

③ **To reset the setting to the initial value:** Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST once more. After the message “PRESET DATA OK?” appears, push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST again.

The setting is reset to the initial value.

The action of the CANCEL/PRST function differs for some setting items. Some items are only affected by PRST. Check the setting procedure for each item for more information.

To interrupt the settings change operation

By setting the MENU ON/OFF switch to OFF, the menu disappears from the screen. By setting the MENU ON/OFF switch to ON again, the values that were displayed when you interrupted the setting operations will reappear so you can continue making settings.

7 Push the MENU knob.

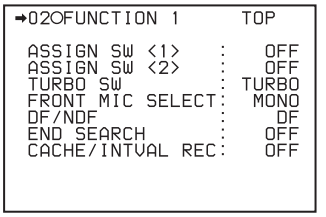
The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark. The setting is confirmed.

8 To continue setting other items on the same page, repeat steps **4** to **7**.

Moving to another page

1 When the ➡ mark is placed at a position of items other than the page number, turn the MENU knob to move the ➡ mark to the page number, then push the MENU knob.

When the ● mark is positioned on the left side of the item and a ? mark is positioned on the left of the setting, push the MENU knob once to remove the setting mode. Then turn the MENU knob to move the ➡ mark to the page number, then push the MENU knob.


➡02 FUNCTION 1 TOP
ASSIGN SW <1> : OFF
ASSIGN SW <2> : OFF
TURBO SW : TURBO
FRONT MIC SELECT : MONO
DF/NDF : DF
END SEARCH : OFF
CACHE/INTVAL REC : OFF

Or, push the CANCEL/PRST / ESCAPE switch to ESCAPE when the ➡ mark is placed at a position of items other than the page number.

A ? mark appears in front of the page number. The camcorder is now in page selecting mode.

2 Turn the MENU knob until the desired page appears.

3 Push the MENU knob when the desired page appears.

To end menu operations

You can end menu operations using one of the following two methods:

- Turn the MENU ON/OFF switch to OFF.
- Close the switch cover of the menu operating section. When you close the switch cover, the MENU ON/OFF switch is set to OFF automatically.

The menu disappears from the viewfinder screen, and the display indicating the current status of the camcorder appears along the top and bottom of the screen (when the viewfinder DISPLAY switch is set to ON or the VF DISP item on the VF DISP 1 page of the USER menu is set to ON).

For details of the viewfinder display, see "5-2-2 Selecting Display Items" on page 84.

5-1-3 Editing the USER Menu

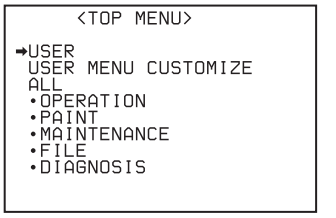
The USER MENU CUSTOMIZE menu allows you to configure a USER menu that consists only of pages and items that you need, by adding, deleting or replacing pages.

Adding a new page

The USER MENU CUSTOMIZE menu allows you to add a new page to the USER menu.
While the USER 1 EDIT page contains factory-preset items, the USER 2 EDIT to USER 19 EDIT pages and the ASSIGN EDIT page are all blank in their initial state. You can register up to 10 items, including blank lines, on each of these pages.

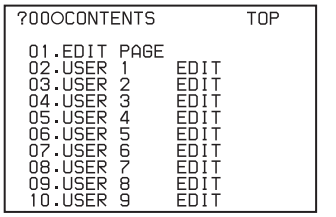
1 While holding down the MENU knob, move the MENU ON/OFF switch from the OFF position to the ON position.

The TOP menu appears.



2 Turn the MENU knob to move the ➡ mark to USER MENU CUSTOMIZE, then push the MENU knob.

If this is the first time the USER MENU CUSTOMIZE menu has been displayed, the CONTENTS page of the menu appears.



If the USER MENU CUSTOMIZE menu has been used before, the page accessed last appears.

3 When the CONTENTS page is displayed, push the MENU knob once, and then turn the MENU knob to move the ➡ mark to the desired page number from among USER 1 EDIT to USER 19 EDIT and ASSIGN EDIT. Then push the MENU knob.

Or, turn the MENU knob until the desired page appears, then push the MENU knob.

Example: When you want to select the USER 2 EDIT page

```
 03OUSER2 EDIT     TOP
➡Add New Item
```

4 Move the ➡ mark to Add New Item (this operation is unnecessary if no item exists on the page as shown in the figure for step **3**), then push the MENU knob.

The page for the last added item appears.

```
 43OBLACK/FLARE     ESC
     ●●● SELECT ITEM ●●●
➡MASTER BLACK     :     0
 R BLACK          :     0
 G BLACK          :     0
 B BLACK          :     0
 MASTER FLARE     :     0
 R FLARE          :     0
 G FLARE          :     0
 B FLARE          :     0
 FLARE            :    ON
 TEST OUT SEL     :   ENC
```

5 Add the items.

① Turn the MENU knob until the page that has the desired items appears, then push the MENU knob.

② Turn the MENU knob to move the ➡ mark to the desired item, then push the MENU knob.

The USER 2 EDIT page appears again, displaying the newly added item.

6 To add the remaining items, repeat steps **4** to **6**.

You can add up to 10 items on one page.

To delete items from a page

You can delete items from any of the USER 1 EDIT to USER 19 EDIT pages.

1 Turn the MENU knob to move the ➡ mark to the item to be deleted.

2 Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST.

The message “DELETE ITEM OK?” appears.

3 Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST again.

The item is deleted.

To change the order of items on a page

1 Turn the MENU knob to move the ➡ mark to the item to be replaced, then push the MENU knob.

2 Turn the MENU knob to move the ➡ mark to the position where you want to move the item, then push the MENU knob.

```
 02OUSER1 EDIT     TOP
     PUSH TO ITEM INSERT
➡WHITE SWITCH <B>:    ATW

 TEST OUT MENU    :    OFF

 OFFSET WHITE <A>:    OFF
 WARM-COOL     <A>:   3200
 WARM-COOL BAL<A>:      0
●MASTER BLACK     :      0
```

The item selected in step **1** moves to the position that you selected in step **2**.
In the above example, MASTER BLACK will be moved to the top and the other items are moved down one line.

To insert a blank line

Turn the MENU knob to move the ➡ mark to the position where you want to insert a blank row, and push and hold the MENU knob for about 3 seconds.
A blank row is inserted.

Push and hold the MENU knob for about 3 seconds.

```
? 02OUSER1 EDIT     TOP
     PUSH TO ITEM INSERT
●MASTER BLACK     :      0
 WHITE SWITCH <B>:    ATW

 TEST OUT MENU    :    OFF

 OFFSET WHITE <A>:    OFF
 WARM-COOL     <A>:   3200
 WARM-COOL BAL<A>:      0
 Add New Item
```

```
? 02OUSER1 EDIT     TOP

 MASTER BLACK     :      0
➡
 WHITE SWITCH <B>:    ATW

 TEST OUT MENU    :    OFF

 OFFSET WHITE <A>:    OFF
 WARM-COOL     <A>:   3200
 WARM-COOL BAL<A>:      0
 Add New Item
```

In the above example, a blank row is inserted between MASTER BLACK and WHITE SWITCH <B>.

Note

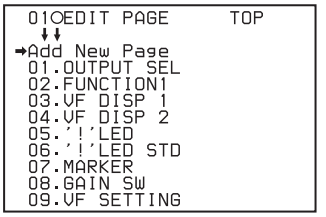
You cannot insert a blank row on a page where 10 items have been already registered.

Adding/deleting/replacing pages

You can add a new page to the USER menu, delete a page from the USER menu, or replace pages, using the EDIT PAGE of the USER MENU CUSTOMIZE menu.

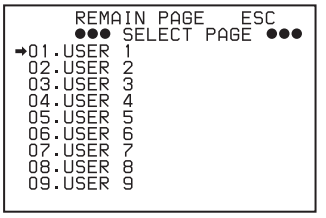
To add a page

1 Follow steps **1**, **2**, and **3** in *" Adding a new page" on page 78* to display the EDIT PAGE page of the USER MENU CUSTOMIZE menu.



2 Turn the MENU knob to move the ➡ mark to Add New Page, then push the MENU knob.

The selection screen appears.



3 Turn the MENU knob to move the ➡ mark to the desired page, then push the MENU knob.

The selected page is added to the last page of the USER menu.

To cancel adding a page

Before pressing the MENU knob in step **3**, turn the MENU knob to move the ➡ mark to ESC at the top right of the screen, then push the MENU knob.
The EDIT PAGE screen appears again.

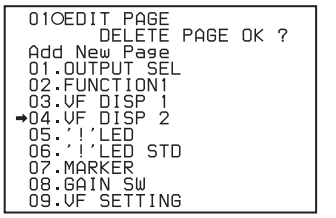
To delete a page

1 Follow steps **1**, **2**, and **3** in *" Adding a new page" on page 78* to display the EDIT PAGE page of the USER MENU CUSTOMIZE menu.

2 Turn the MENU knob to move the ➡ mark to the page to be deleted.

3 Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST.

The message "DELETE PAGE OK?" appears.



4 Push the CANCEL/PRST / ESCAPE switch to CANCEL/PRST again.

In the above example, the VF DISP 2 page will be deleted.

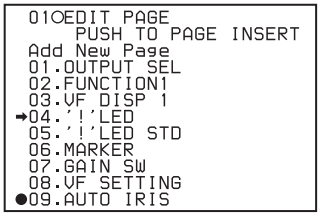
To change the order of pages

1 Follow steps **1**, **2**, and **3** in *" Adding a new page" on page 78* to display the EDIT PAGE page of the USER MENU CUSTOMIZE menu.

2 Turn the MENU knob to move the ➡ mark to the page that you want to move.

The ➡ mark changes to a ● mark.
The message "PUSH TO PAGE INSERT" appears at the right top of the screen.

3 Turn the MENU knob to move the ➡ mark to the position where you want to move the page selected in step **1**.



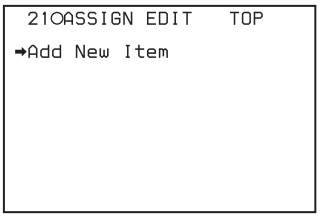
4 Push the MENU knob.

The page selected in step **2** is moved to the position selected in step **3**.
In the above example, AUTO IRIS will be moved to the 04 position and the '!' LED and following items will be moved down one line.

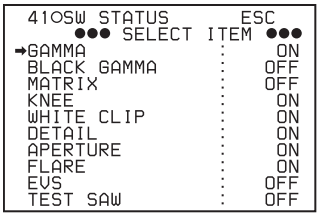
5-1-4 Adding Functions to be Assigned to Assignable Switches

You can add items to be assigned to assignable switches using the ASSIGN EDIT page of the USER MENU CUSTOMIZE menu.

1 Follow steps **1**, **2**, and **3** in *"Adding a new page" on page 78* to display the ASSIGN EDIT window of the USER MENU CUSTOMIZE menu.



2 Move the ➡ mark to Add New Item (this operation is unnecessary, if no item exists on the page as shown in the figure for step 1), then push the MENU knob.



3 Add the desired items.

① Turn the MENU knob until the page that has the desired items appears, then push the MENU knob.

② Turn the MENU knob to move the ➡ mark to the desired item, then push the MENU knob.

The ASSIGN EDIT window appears again, displaying the newly added item.

4 To add the remaining items, repeat steps **2** and **3**.

You can add up to 10 items.

To delete items or to change the order of items

You can delete items from the page or change the order of items on the page by following the same operations as those for adding a new page.

Note

You cannot add a blank line.

For details, see “To delete items from a page” on page 79 and “To change the order of items on a page” on page 79.

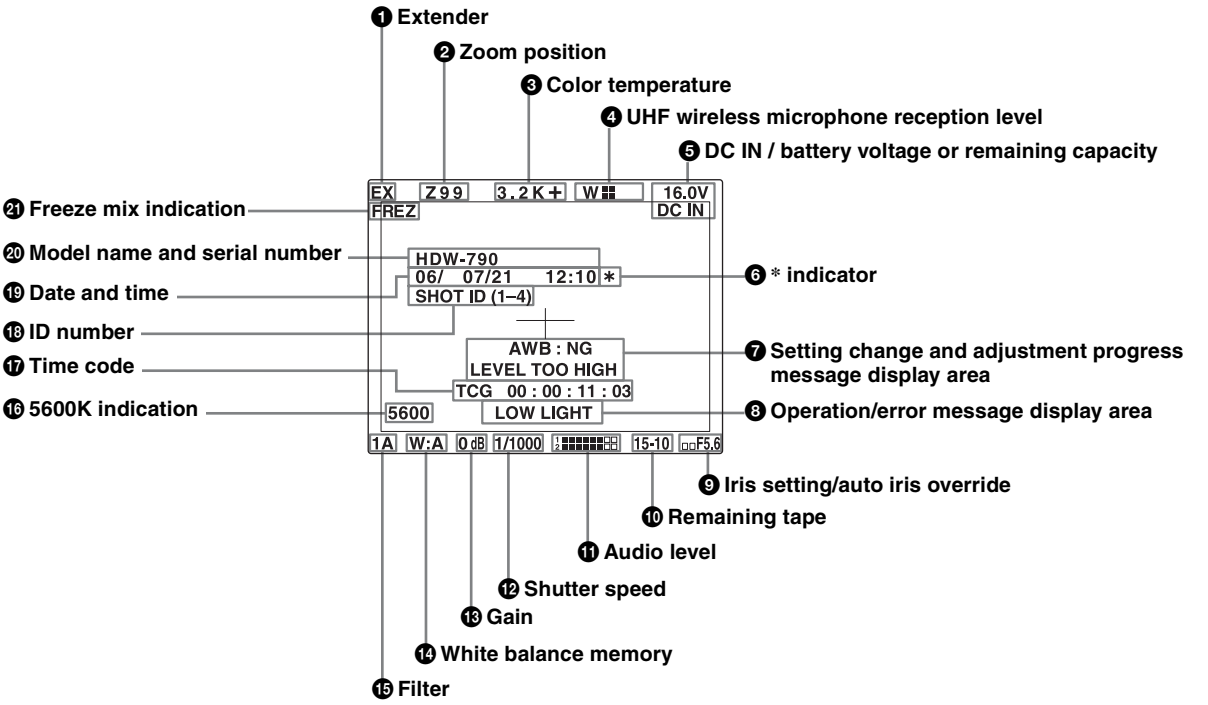
5-2 Status Display on the Viewfinder Screen

The viewfinder screen displays not only the video picture but also characters and messages indicating the camcorder settings and operating status, a center marker, a safety zone marker, etc.
When the MENU ON/OFF switch is set to OFF and the DISPLAY switch is set to ON, the items for which an "ON" setting was made in the VF DISP 1 page of the USER menu or with related switches are displayed at the top and bottom of the screen. Messages that give details of the settings and adjustment progress and results can also be made to appear for about 3 seconds while settings are being changed, during adjustment, and after adjustment.

For information about display item selection, see "5-2-2 Selecting Display Items" on page 84.
For information about setting change and adjustment progress messages, see "5-2-3 Display Modes and Setting Change Confirmation/Adjustment Progress Messages" on page 85.
For information about marker display, see "5-2-5 Setting Marker Display" on page 87.

5-2-1 Layout of the Status Display on the Viewfinder Screen

All items that can be displayed on the viewfinder screen are shown below.



❻, ❶❽, ❶❾ and ❷❿ appear only when color bars are displayed.

❶ Extender
"EX" is displayed when a lens extender is used.

❷ Zoom position
This indicator appears only when you use a lens that has a zoom position display function. It indicates the approximate position of the variator [1] of the zoom lens, between wide angle and telephoto.

1) Variator
A group of lenses that are moved to adjust the focal length.

❸ Color temperature
This indicates the currently selected color temperature.

❹ UHF wireless microphone reception level
This indicates the reception level of the wireless microphone when the UHF wireless microphone is attached, using four ■ which appear at the right of "W." When all four ■ are lit, the reception is good.

❺ DC IN / battery voltage or remaining capacity
This shows the battery voltage or remaining capacity of an internal battery pack.
When the power is supplied from an AC adaptor connected to the DC IN connector, "DC IN" appears.
When the DISP BATT REMAIN item is set to "INT" or "AUTO" on the VF DISP 2 page of the USER menu, the remaining battery capacity is automatically detected and indicated as a percentage when the Anton Bauer intelligent battery system or the BP-GL65/GL95 battery pack is used. The indicated value changes in steps of 10%.

- Until the remaining battery capacity is reduced to 40%, the indications MAX, 90%, 80%...40% are displayed for 3 seconds in the viewfinder each time the remaining battery capacity reduces by 10%.[1)]
- When the remaining battery capacity is less than 40%, the indication is displayed all the time.
- When the remaining battery capacity is less than 10%[2)], the indication flashes. When the remaining battery capacity is reduced further, the LOW indication flashes.

1) When the DISP BATT REMAIN item is set to "AUTO," the remaining capacity of the battery is displayed all the time.
When VOLT is selected, or even when AUTO is selected, if the remaining battery capacity cannot be detected is used, the battery voltage is displayed.
2) This value can be set to either 10% or 20% on the FUNCTION 2 page of the OPERATION menu.

❻ * indicator
This flashes when the color bars are displayed and is recorded together with the color bars.

❼ Setting change and adjustment progress message display area

For details, see "5-2-3 Display Modes and Setting Change Confirmation/Adjustment Progress Messages" on page 85.

❽ Operation/error message display area

For details, see "Operation/error messages" on page 140.

❾ Iris setting/auto iris override
This indicates the f-stop (iris setting) of the lens.
Also, the auto iris override is displayed using bars which appear in the upper and lower parts of the screen, to the left of the F number respectively.

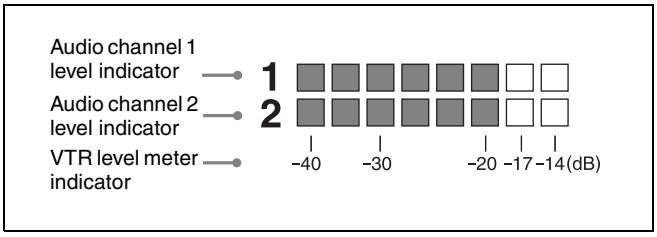
For details, see "4-3 Changing the Reference Value for Automatic Iris Adjustment" on page 66.

❿ Remaining tape
This indicator indicates the remaining tape recording time (in minutes) of the VTR.

Examples of remaining tape recording time indication

Indication	Remaining tape recording time
F – 30	Full to 30 minutes
30 – 25	30 to 25 minutes
25 – 20	25 to 20 minutes
20 – 15	20 to 15 minutes
15 – 10	15 to 10 minutes
10 – 5	10 to 5 minutes
5 – 0	5 to 2 minutes
5 – 0 (flashing)	2 to 0 minutes

⓫ Audio level
These items indicate the level of audio channel 1 and channel 2. The peak indication of the VTR level meter is related as follows to the audio level when a 1-kHz sine wave is input.



⓬ Shutter speed
This indicates the shutter speed or the shutter mode. However, if the SHUTTER selector is set to OFF, nothing is displayed.
1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000: Shutter speed (in seconds) in standard mode
ECS: ECS mode
EVS: EVS mode
1F to 8F, 16F, 32F, 64F: Number of frames in SLS mode[1)]

1) The SLS mode is effective only when an optional HKDW-905R extension board is installed.

⓭ Gain
This indicates the gain of the video amplifier, as set by the GAIN selector.

⓮ White balance memory
This indicates the currently selected white balance automatic adjustment memory.
A: Displayed when the WHITE BAL switch is set to A.
B: Displayed when the WHITE BAL switch is set to B.
P: Displayed when the WHITE BAL switch is set to PRST.
T: Displayed when ATW is being used.
When an optional RM-B150/B750 Remote Control Unit is connected, you can switch the memory using the switch on the RM-B150/B750.

⓯ Filter
This indicates the currently selected filter types.

⓰ 5600K indication
This appears when the electric 5600K color temperature filter function has been activated on the FUNCTION 2 page of the OPERATION menu.
When AWB is executed for shooting an object of high color temperature, and 5600K may be set to ON automatically.

⓱ Time code
This indicates the time code, user bits, or other information selected by the DISPLAY switch and DATA DISPLAY switch settings.

For more information, see "Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays" on page 33.

⓲ ID number
This indicates the ID number selected, from ID 1 to ID 4. The ID number is recorded together with the color bars.

⓳ Date and time
This indicates the date and time of recording, which are recorded together with the color bars.

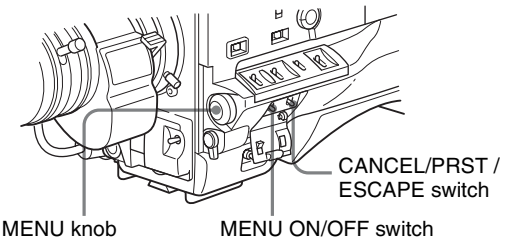
⓴ Model name and serial number
This indicates the model name and serial number of the camcorder, which are recorded together with the color bars.

㉑ Freeze mix indication
This indicates the type of the freeze-frame picture displayed by using the Freeze Mix function.
FREZ: A freeze-frame picture of the video from the camera
MIX: The freeze-frame picture obtained by the Freeze Mix function and the video currently being input from the camera are mixed.

For details, see "5-3-10 Using the Freeze Mix Function" on page 103.

5-2-2 Selecting Display Items

To select the items to be displayed on the viewfinder screen from the VF DISP 1 and VF DISP 2 pages of the USER menu, turn the indication next to each item on or off.



1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the VF DISP 1 or VF DISP 2 page appears, then push the MENU knob to select that page.

The current setting is displayed on the right of each item.

```
 04OVF DISP 1

→VF DISP          :●    ON
 VF DISP MODE     :      3
 DISP EXTENDER    :     ON
 DISP FILTER      :     ON
 DISP WHITE       :     ON
 DISP 5600K       :     ON
 DISP GAIN        :     ON
 DISP SHUTTER     :     ON
 DISP AUDIO       :     ON
 DISP TAPE        :     ON
```

You can select the following items to be displayed on the screen on the VF DISP 1 or VF DISP 2 page.

VF DISP 1 page

Item	Description
VF DISP	Turning the viewfinder display on or off [1]
VF DISP MODE	Selecting the display mode [2]
DISP EXTENDER	Extender indicator
DISP FILTER	Types of ND and CC filters
DISP WHITE	White balance memory indicator
DISP 5600K	5600K indicator
DISP GAIN	Gain indicator
DISP SHUTTER	Shutter speed and ECS mode indicator
DISP AUDIO	Audio level indicator
DISP TAPE	Remaining tape indicator

1) The viewfinder display can be also turned on or off by using the DISPLAY switch on the viewfinder.
2) For detailed information on the display mode, see *"5-2-3 Display Modes and Setting Change Confirmation/Adjustment Progress Messages" on page 85*.

VF DISP 2 page

Item	Description
DISP IRIS	Iris opening indicator
DISP ZOOM	Zoom position indicator
DISP COLOR TEMP.	Displays the color temperature.
DISP BATT REMAIN	Displays the battery voltage/ remaining capacity of an internal battery pack or an external battery connected to the DC IN connector.
DISP DC IN	Displayed when the power is supplied from an external battery connected to the DC IN connector.
DISP WRR RF LVL	Displays the reception level of the wireless microphone.
DISP TIME CODE	Displays the time code.
DISP FREEZE	Displays the type of freeze-frame picture.[1)]

1) For detailed information on the type of freeze-frame picture, see *"5-3-10 Using the Freeze Mix Function" on page 103.*

3 Turn the MENU knob to move the ➧ mark to the item you want to set, then push the MENU knob.

The ➧ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to select whether the selected item should appear in the viewfinder display (the ON setting), or not appear (the "OFF" setting), then push the MENU knob.

The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

Note that pushing the CANCEL/PRST / ESCAPE switch to CANCEL/PRST on this page has no effect.

5 To continue setting other items, repeat steps **3** and **4**.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-2-3 Display Modes and Setting Change Confirmation/Adjustment Progress Messages

You can limit or suppress the messages that give details of setting changes and adjustment progress and results by setting a display mode.
The conditions under which messages are displayed and their correspondence with the display mode are as follows:

Setting change confirmation/adjustment progress messages and display modes

Y: Message is displayed.
N: Message is not displayed.

Message display conditions	Message	Display mode setting		
		1	2	3
When the filter selection has been changed	ND : n, CC : m (where n = 1, 2, 3, 4, m = A, B, C, D)	N	N	Y
When the gain setting has been changed	GAIN : n (where n = –3 dB, 0 dB, 3 dB, 6 dB, 9 dB,12 dB, 18 dB, 24 dB, 30 dB, 36 dB, 42 dB)	N	N	Y
When the setting of the WHITE BAL switch has been changed	WHITE : n (where n = A CH, B CH, PRESET) or ATW : RUN	N	N	Y
When the OUTPUT/DCC switch has been set to DCC ON or OFF	DCC : ON (or OFF)	N	Y	Y
When the shutter speed and mode setting has been changed [1)]	SS : 1/100 (or 1/125, 1/250, 1/500, 1/1000, 1/2000, ECS, SLS)[2)]	N	Y	Y
When the black or white balance has been adjusted	E.g. AWB : OK (For details, see *"4-1 Adjusting the Black Balance and the White Balance" on page 59*.)	N	Y	Y

1) This is also displayed for about 3 seconds when the SHUTTER selector is set to ON.
2) The shutter speed displayed depends on the selected frame frequency. For details, see *"4-2-1 Shutter Modes" on page 62*.

Changing the display mode

You can change the display mode on the VF DISP 1 page of the USER menu.

1 Follow steps **1** and **2** in *"5-2-2 Selecting Display Items" (page 84)*, until the VF DISP 1 page of the USER menu appears on the screen.

2 Turn the MENU knob to move the ➧ mark to "VF DISP MODE," then push the MENU knob.

The ➧ mark on the left of VF DISP MODE changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

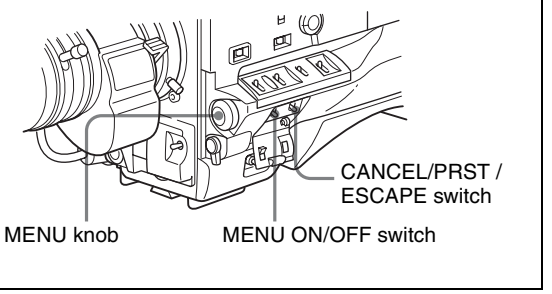
3 Turn the MENU knob until the desired display mode appears, then push the MENU knob.

The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

4 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-2-4 Selecting the Items for Which the '!' LED is to Light

The '!' LED page of the OPERATION menu allows you to select the items for which the '!' indicator is to light up on the viewfinder screen. Also, the '!' LED STD page allows you to select the lighting conditions.



1 Set the MENU ON/OFF switch to ON while holding down the MENU knob.

The TOP menu appears.

2 Turn the MENU knob to move the ➧ mark to OPERATION, then push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page of the OPERATION menu appears.
If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, push the MENU knob once, then turn the MENU knob to move the ➧ mark to '!' LED, then push the MENU knob again to display the '!' LED page.
If a different page is displayed, turn the MENU knob until the '!' LED page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.

```
 06!LED

➧GAIN        <1>  :●   ON
 SHUTTER     <1>  :    ON
 WHITE BAL   <1>  :    ON
 5600K       <1>  :    ON
 ATW         <1>  :    ON
 EXTENDER    <1>  :    ON
 FILTER      <1>  :    ON
 OVERRIDE    <1>  :    ON
```

The following table shows operations under the condition where '!' LED STD has been pre-adjusted at the factory.

Item	Contents
GAIN	Lights when the gain is set to anything but 0 dB.
SHUTTER	Lights when the SHUTTER selector is set to anything but OFF.
WHITE BAL	Lights when the WHITE BAL switch is set to PRST.
5600K	Lights when the 5600K mode is set to ON.
ATW	Lights when ATW is being used.
EXTENDER	Lights when the lens extender is used.
FILTER	Lights when the FILTER selector is set to anything but ND:1/CC:B.
OVERRIDE	Lights when the reference value of the auto iris adjustment is other than the standard value.

4 Perform the settings for each item.

① Turn the MENU knob to move ➧ mark to the item you want to set, then push the MENU knob.

The ➧ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

② Turn the MENU knob to change the setting, then push the MENU knob.

③ To continue setting other items, repeat steps ① and ②.

You can change the criteria for whether the '!' indicator lights or does not light on the '!' LED STD page.
To change the criteria, go to step **5**.
If you don't want to change the criteria, go to step **8**.

5 Move the ➧ mark to the page number, then push the MENU knob. Or when the ➧ mark is located at the left of the item, push the CANCEL/PRST / ESCAPE switch down to ESCAPE.

6 Turn the MENU knob until the '!' LED STD page appears, then push the MENU knob.

```
 07!LED STD

➧GAIN        <1>  :●   0db
 SHUTTER     <1>  :    OFF
 WHITE BAL   <1>  :     AB
 5600K       <1>  :    OFF
 ATW         <1>  :    OFF
 EXTENDER    <1>  :    OFF
 FILTER ND   <1>  :      1
 FILTER CC   <1>  :      B
 OVERRIDE    <1>  :    OFF
```

Item	Description
GAIN	GAIN switch position L, M, H, or 0 dB
SHUTTER	Shutter mode OFF, ECS, SLS[1], 1/60[2]
WHITE BAL	White balance automatic adjustment memory, P (PRST), A, B, PA, PB, or AB
5600K	5600K mode ON or OFF
ATW	ATW ON or OFF
EXTENDER	Extender ON or OFF
FILTER ND	ND Types of the ND filter, 1, 2, 3, or 4
FILTER CC	CC Types of the CC filter, A, B, C, or D
OVERRIDE	ON or OFF when the reference value of the auto iris adjustment is other than the standard value

1) The SLS mode is effective only when an optional HKDW-905R extension board is installed.
2) Depending on the frame frequency currently selected. For details, see *"4-2-1 Shutter Modes" on page 62*.

7 Perform the settings for each item.

① Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

② Turn the MENU knob to change the setting, then push the MENU knob.

③ To continue setting other items, repeat steps ① and ②.

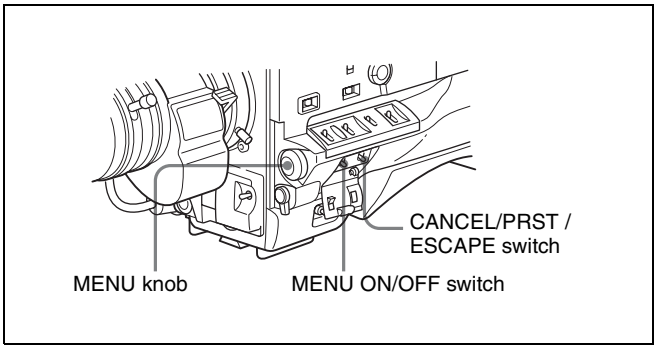
8 To end the menu operation, set the MENU ON/OFF switch to OFF.

When you change the settings only on the '!' LED page

The '!' LED page is also registered in the USER menu. You can access this page without opening the TOP page. Open the USER menu by pressing the MENU ON/OFF switch and display this page from the USER menu.

5-2-5 Setting Marker Display

The MARKER 1 page of the USER menu allows you to switch the display of the center and safety zone markers on or off and to select the area indicated by the safety zone marker.

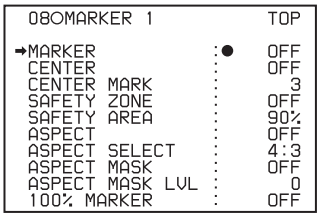


1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the MARKER 1 page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.



You can set the following items on the MARKER 1 page.

Item	Description
MARKER	When you do not want to display all markers, set to OFF.
CENTER	To display the center marker, set to ON.
CENTER MARK	Selects the type of center marker (1 to 4), when CENTER is set to ON.
SAFETY ZONE	To display the safety zone, set to ON.
SAFETY AREA	Selects the safety zone range (80%, 90%, 92.5% or 95%), when SAFETY ZONE is set to ON.
ASPECT	To display the aspect marker, set to ON.
ASPECT SELECT	Selects the type (15:9, 14:9, 13:9, 4:3, 1.85, 2.35) of the aspect marker.
ASPECT MASK[1]	To make the areas out of the selected aspect marker dimmer, set to ON.
ASPECT MASK LVL	Sets the mask level (0 to 8), when the ASPECT MASK is set to ON.
100% MARKER	To display the effective pixel area, set to ON.

1) The ASPECT MASK item is for processing the signal to be output to the viewfinder. When R, G, or B is selected for the OUTPUT SELECT item from the menu, the masked video signal is output to the TEST OUT connector.

3 Perform the settings for each item.

① Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

② Turn the MENU knob to change the setting, then push the MENU knob.

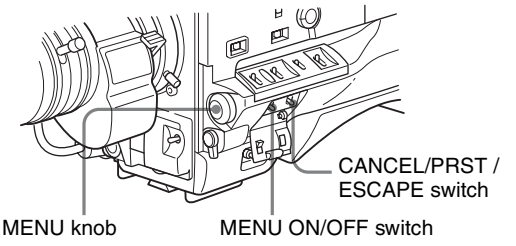
The ● mark on the left of the selected item returns to a ➡ mark, and the ? mark on the left of the setting returns to a ● mark.

4 To continue setting other items, repeat step **3**.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-2-6 Setting the Viewfinder

The VF SETTING page of the USER menu allows you to select items related to the viewfinder.



1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the VF SETTING page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.

```
 11OVF SETTING

➡ZEBRA              :●  OFF
 ZEBRA SELECT       :     1
 ZEBRA1 DET.LVL     :   70%
 ZEBRA2 DET.LVL     :  100%

 ASPECT             :   OFF

 VF DETAIL LEVEL    :     0
 VF DTL H LEVEL     :     0
 VF DTL V LEVEL     :     0
```

Item	Description
ZEBRA	Turns the zebra display on or off. [1]
ZEBRA SELECT	Selects ZEBRA 1, ZEBRA 2 or BOTH.
ZEBRA1 DET. LVL	Adjusts the level of the zebra 1 (factory setting: 70%) display.
ZEBRA2 DET. LVL	Adjusts the level of the zebra 2 (factory setting: 100%) display.
ASPECT	Selects the viewfinder aspect ratio.
VF DETAIL LEVEL	Adjusts the sharpness of the viewfinder. [2] Turns the VF detail function on or off and adjusts the level (–99 to 99).
VF DTL H LEVEL	Adjusts the VF H detail level (–99 to 99).
VF DTL V LEVEL	Adjusts the VF V detail level (–99 to 99).

1) When you use a viewfinder that is not equipped with a ZEBRA switch, turn the display on or off using this item. When you use a viewfinder with a ZEBRA switch, the most recent operation of the ZEBRA switch and this menu operation will be effective.
2) The sharpness setting at the viewfinder does not affect the recorded image.

3 Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to change the setting, then push the MENU knob.

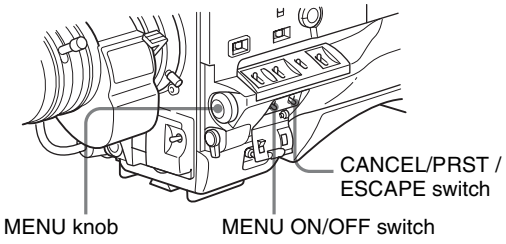
The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

5 To continue setting other items, repeat steps **3** and **4**.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-2-7 Recording Shot Data Superimposed on the Color Bars

The SHOT DISP page of the USER menu allows you to select which shot data is recorded superimposed on the color bars. You can also select which of the shot IDs (1 to 4) set in the SHOT DISP page is recorded superimposed on the picture.

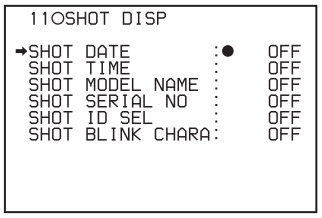


1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the SHOT DISP page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.



Item	Description
SHOT DATE	Selects whether or not the shot date is superimposed (ON or OFF).
SHOT TIME	Selects whether or not shot time is superimposed (ON or OFF).
SHOT MODEL NAME	Selects whether or not the model name is superimposed (ON or OFF).
SHOT SERIAL NO	Selects whether or not the serial number is superimposed (ON or OFF).
SHOT ID SEL	Selects whether or not the shot ID set on the SHOT ID 1) page is superimposed (1 to 4 or OFF).
SHOT BLINK CHARA	Selects whether or not a blinking * is superimposed (ON or OFF).

1) To carry out superimposed recording, select the SHOT ID number (1 to 4). To record without superimposing the SHOT ID, select "OFF."

3 Turn the MENU knob to move the ➡ mark to the item you want to set, then push MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to select whether or not to record the selected item superimposed on the color bars, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

5 To continue setting other items, repeat steps **3** and **4**.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

Carrying out superimposed recording

To actually record the items selected for superimposed recording on the SHOT DISP page, set the OUTPUT/DCC switch to BARS.
The items selected for superimposed recording appear on the screen and are recorded superimposed on the color bars.

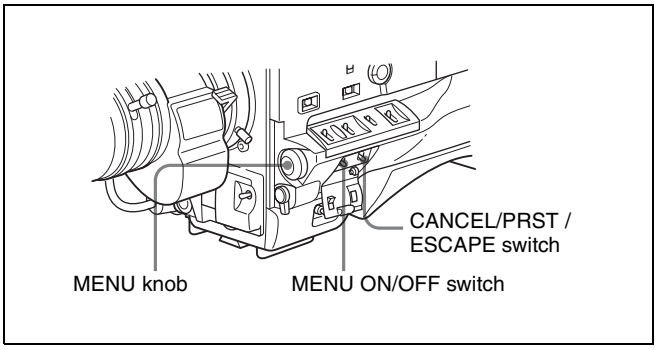
5-2-8 Setting the Shot ID

On the SHOT ID page of the USER menu, you can set a shot ID of up to 12 alphanumeric characters, spaces, and symbols.
When the OUTPUT/DCC switch is set to BARS, this shot ID is output with the color bar signal. The shot ID comprises ID1 to ID4, and you can select the SHOT ID to be recorded using the SHOT DISP page.

For detailed information on the OUTPUT/DCC switch position, see "OUTPUT/DCC (output signal/dynamic contrast control) switch" on page 24.

Note

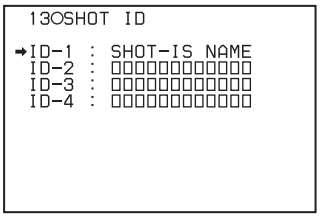
When the menu is displayed, the shot ID is not displayed, even if the color bar signal is output.



1 Set the MENU ON/OFF switch to ON.

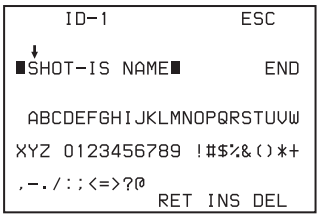
The menu page accessed last appears on the screen.

2 Turn the MENU knob until the SHOT ID page appears, then push the MENU knob to select the page.



3 Turn the MENU knob to move the ➡ mark to the ID (one of ID-1 to ID-4) you want to set, then push the MENU knob.

The window used to enter the shot ID appears.
A ⬇ mark appears over the first character position in the string, and characters can now be input.

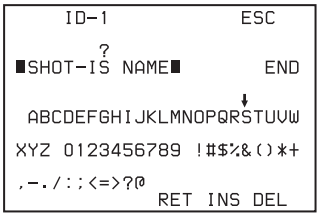


4 Enter or change the shot ID.

When you are entering the whole shot ID, go to step ②.

① Turn the MENU knob to move the ⬇ mark to the character that you want to change, then push the MENU knob.

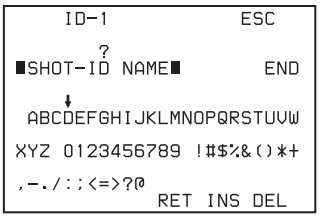
The ⬇ mark changes to a ? mark and the character table appears.
The ⬇ mark moves to the character table.



② Turn the MENU knob until the ⬇ mark moves to the character position that you want to select, then push the MENU knob.

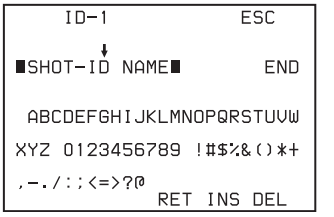
Example: To change “S” to “D”

Move the ⬇ mark to D. D appears under the ? mark.



Push the MENU knob.

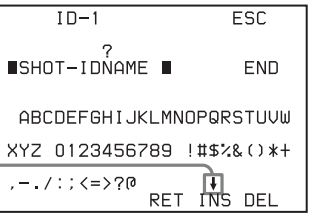
The ? mark changes to a ⬇ mark.



To enter a space

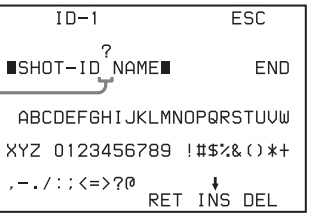
Move the ⬇ mark over the INS, then push the MENU knob. The space is entered in the position under the ? mark on the character entry row.
When there is a character under the ? mark, subsequent characters move to the right one at a time.

Move the ⬇ mark over INS.



Push the MENU knob.

Space



Move the ⬇ mark over RET, then push the MENU knob. The ? mark over the space on the character entry row changes to a ⬇ mark.

To delete a character

Move the ⬇ mark over DEL, then push the MENU knob. The character under the ? mark is deleted and the subsequent characters move to the left one at a time.

To cancel deletion of the character

Move the ⬇ mark over RET, then push the MENU knob. The ? mark on the character entry row changes to a ⬇ mark.

5 To enter any remaining characters, repeat step **4**.

6 When you finish entering characters, turn the MENU knob to move the ⬇ mark over END, then push the MENU knob.

The character setting mode is cleared and the SHOT ID page appears.

To cancel entering or changing a shot ID

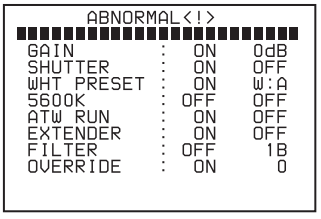
Before executing step **6** of the procedure for setting the shot ID, move the ➡ mark to "ESC" at the top right of the screen, then push the MENU knob or push the CANCEL/PRST / ESCAPE switch down to ESCAPE.
This cancels all changes, and returns to the SHOT ID page.

5-2-9 Displaying the Status Confirmation Windows

You can confirm the settings or status of the camcorder on the screen by displaying the following three windows.
- ABNORMAL <!> window
- FUNCTION window
- AUDIO STATUS window

Indications on the windows

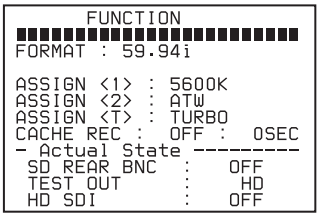
ABNORMAL <!> window



This window allows you to confirm why the ⚠ (warning) indicator lights.
You can use the '!' LED page of the USER menu to set whether or not the ⚠ (warning) indicator lights.

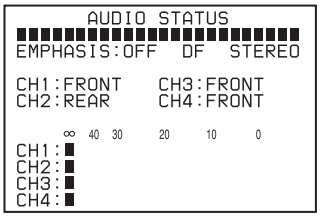
For details, see "5-2-4 Selecting the Items for Which the '!' LED is to Light" on page 86.

FUNCTION window



This window allows you to confirm the assigned function of the ASSIGN 1/2 switches and the TURBO GAIN button, ON/OFF of the Picture Cache function, and ON/OFF of the output of the BNC connectors (such as TEST OUT and HD-SDI OUT connectors).

AUDIO STATUS window

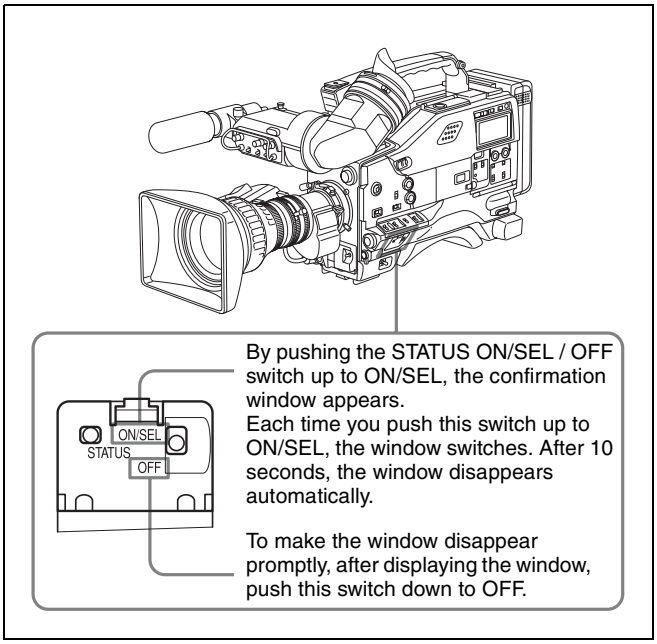


This window allows you to confirm the following items related to audio.
- ON/OFF of EMPHASIS, setting criteria for DF/NDF and FRONT MIC MONO/STEREO
- Type of input signal input to audio channels CH1/CH2/CH3/CH4
- Input level of audio channels CH1/CH2/CH3/CH4

You can use the SET STATUS page of the USER menu to set whether or not the status confirmation windows are displayed.

Displaying the status confirmation windows

You can use the CANCEL/PRST / ESCAPE switch as the STATUS ON/SEL / OFF switch when the MENU ON/OFF switch is set to OFF (when the cover of the menu operating section is closed, OFF is automatically selected).


ON/SEL
STATUS
OFF
By pushing the STATUS ON/SEL / OFF switch up to ON/SEL, the confirmation window appears.
Each time you push this switch up to ON/SEL, the window switches. After 10 seconds, the window disappears automatically.
To make the window disappear promptly, after displaying the window, push this switch down to OFF.

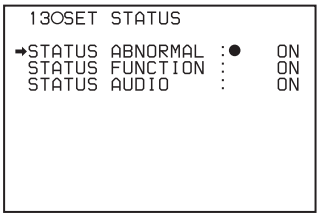
Disabling display of the status confirmation windows

1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the SET STATUS page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.



Item	Description
STATUS ABNORMAL	Selects whether or not the ABNORMAL window is displayed (ON or OFF).
STATUS FUNCTION	Selects whether or not the FUNCTION window is displayed (ON or OFF).
STATUS AUDIO	Selects whether or not the STATUS AUDIO window is displayed (ON or OFF).

3 Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to select whether or not to display the selected window, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

5 To continue setting other windows, repeat steps **3** and **4**.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-2-10 Confirming the Image of the Return Video Signal in the Viewfinder

The GENLOCK page of the MAINTENANCE menu allows you to set whether or not to see the image of the return video signal in the viewfinder. You can confirm only the image of HD-Y return video signal.

1 Set the MENU ON/OFF switch to ON while holding down the MENU knob.

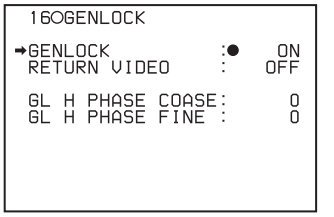
The TOP menu appears.

2 Turn the MENU knob to move the ➡ mark to MAINTENANCE, then push the MENU knob.

If this is the first time the MAINTENANCE menu has been displayed, the CONTENTS page of the MAINTENANCE menu appears.
If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, push the MENU knob once, then turn the MENU knob to move the ➡ mark to GENLOCK, then push the MENU knob again to display the GENLOCK page.
If a different page is displayed, turn the MENU knob until the GENLOCK page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.



4 Carry out setting operations as follows:

① Turn the MENU knob to move the ➡ mark to GENLOCK, then push the MENU knob.

The ➡ mark on the left of GENLOCK changes to a ● mark, and the ● mark on the left of the GENLOCK setting changes to a ? mark.

② Turn the MENU knob until OFF appears, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark, and the setting is executed.

③ Turn the MENU knob to move the ➡ mark to RETURN VIDEO, then push the MENU knob.

The ➡ mark changes to a ● mark, and the ● mark changes to a ? mark.

④ Turn the MENU knob until ON appears, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark, and the setting is executed.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

Seeing the image of the return video signal on the viewfinder screen

Hold down the RET button on the lens. The image of the return video signal input to the GENLOCK IN connector is displayed on the viewfinder screen while you are holding down the RET button.

When the return video function is assigned to the ASSIGN 1 switch, you can see the image of the return video signal on the viewfinder screen while you are holding down the ASSIGN 1 switch even if the RETURN VIDEO item is set to “OFF” on the GENLOCK page of the MAINTENANCE menu.

Note

When no signal is input to the GENLOCK IN connector, the image is not changed even if you hold down the RET button on the lens.
However, the image is switched while you are holding down the ASSIGN 1 switch to which the return video function is assigned, even if no signal is input to the GENLOCK IN connector.

5-3 Adjustments and Settings from Menus

The camcorder provides menus for adjustments and settings.

5-3-1 Setting Gain Values for the GAIN Selector Positions

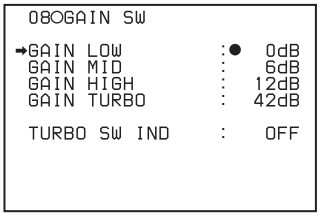
Before using the camcorder, use the GAIN SW page of the USER menu to set the gains corresponding to the L, M, and H positions of the GAIN selector, which switches the gain of the video amplifier.

1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the GAIN SW page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.



Item	Description
GAIN LOW	Sets the gain value corresponding to the L position of the GAIN selector.
GAIN MID	Sets the gain value corresponding to the M position of the GAIN selector.
GAIN HIGH	Sets the gain value corresponding to the H position of the GAIN selector.
GAIN TURBO	Sets the gain value corresponding to TURBO GAIN button selection.
TURBO SW IND	OFF: When you operate the GAIN selector after pressing the TURBO GAIN button once, the video gain is changed according to the GAIN selector operation. ON: When the video gain is boosted to gain value preset by pressing the TURBO GAIN button once, the video gain is not changed even if you operated the GAIN selector, until you press the TURBO GAIN button once more.

3 Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to change the setting, then push the MENU knob.

The ● mark on the left of the selected item returns to a ➡ mark, and the ? mark on the left of the setting returns to a ● mark.

Any of –3, 0, 3, 6, 9, 12, 18, 24, 30, 36 or 42 dB can be set for each of the L, M, and H positions, in any sequence.

To change the gain corresponding to another switch position, repeat steps **3** and **4**.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-3-2 Selecting Output Signals

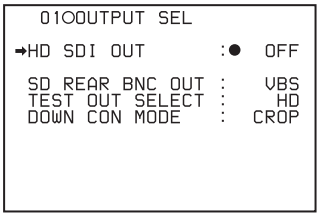
The OUTPUT SEL page of the USER menu allows you select whether the HD-SDI OUT connectors output an HD-SDI signal or not. When an optional HKDW-702 extension board is installed in the camcorder, you can select the type of video signals from the HD-SDI OUT connector (located on the side of the camcorder) and the TEST OUT connector, among from SD VBS, or SD SDI.

1 Set the MENU ON/OFF switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen.

2 Turn the MENU knob until the OUTPUT SEL page appears, and push the MENU knob.

The OUTPUT SEL page appears.
The current setting of an item appears to the right of the item.



Item	Content
HD SDI OUT	Sets whether or not the video signal is output from the HD-SDI OUT connector. When OFF is selected, the HD-SDI circuit is disconnected, which saves power.
SD REAR BNC OUT 1)	Selects the type of video signal to be output from the HD-SDI OUT connector (located on the side of the camcorder), OFF, VBS, or SDI 2).
TEST OUT SELECT 1)	Selects the type of video signal to be output from the TEST OUT connector. When HD is selected, an HD-Y signal is output. When SD is selected, a down-converted color composite signal is output. 3)
DOWN CON MODE 1)	Selects the conversion mode of the down converter from among SQEZE, LETTR and CROP. SQEZE: The picture is displayed without distortion on a monitor with a 16:9 aspect ratio. On a monitor with the 4:3 aspect ratio, the picture is distorted horizontally. LETTR: Displays the picture without distortion on a monitor with the 4:3 aspect ratio, a video signal in the 16:9 aspect ratio is output by adding a blank area (no signal, black) top and bottom. CROP 4): By cropping both the left and right sides of a video image with the 16:9 aspect ratio, a video signal with the 4:3 aspect ratio is output.

1) When an optional HKDW-702 is not installed, these items are not displayed on the OUTPUT SEL page.
2) When SDI is selected, connect the HD-SDI OUT connector (located on the side of the camcorder) to the SDI IN connector of the monitor. When VBS is selected, connect the HD-SDI OUT connector to the VIDEO IN connector of the monitor.
3) When no picture is displayed on the monitor with the TEST OUT connector feeding the monitor, make sure the type of monitor (HD monitor / NTSC/PAL monitor) and the signal format of the output signal of the camcorder (1080i/525i) match.
4) The markers and zebra patterns are not displayed for an SD VBS signal output from the TEST OUT connector when CROP is selected.

3 Turn the MENU knob to move the ➡ mark to the item you want to set, and push the MENU knob.

The ➡ at the left of the selected item changes to a ● mark and the ● mark at the left of the setting changes to a ? mark.

4 Turn the MENU knob to change the desired setting, and push the MENU knob.

The ● mark at the left of the selected item changes to a ➡ mark and the ? mark at the left of the setting changes to a ● mark.
To continue changing of another output signal setting, repeat steps **3** and **4**.

5 To end menu operations, turn the MENU ON/OFF switch to OFF.

5-3-3 Setting the Color Temperature Manually

You can adjust the value of the white balance manually by setting the color temperature.

1 Holding down the MENU knob, move the MENU ON/OFF switch to ON.

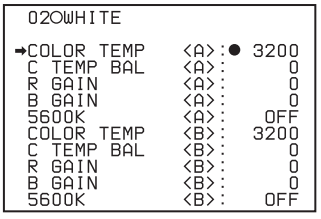
The TOP menu appears.

2 Turn the MENU knob to move the ➡ mark to PAINT, then push the MENU knob.

If this is the first time the PAINT menu has been displayed, the CONTENTS page appears.
If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, push the MENU knob once, and turn the MENU knob to move the ➡ mark to WHITE. Then push the MENU knob to display the WHITE page.
If a different page is displayed, turn the MENU knob until the WHITE page appears, then push the MENU knob to select that page.

The current setting of each item appears on the right of the item.



Item	Description
COLOR TEMP <A>	Sets the color temperature to the desired value. Adjust the value while looking at the real image because error tends to be bigger for adjustment of high color temperature.
C TEMP BAL <A>	Adjusts the value more precisely when the color temperature adjustment through COLOR TEMP is not satisfactory.
R GAIN <A>	Only the value of R GAIN is changed.
B GAIN <A>	Only the value of B GAIN is changed.
5600K <A>	Provides the same effect when the 5600K filter is used by setting to ON.

The above table shows the adjustment of the white balance of channel A.
Items followed by "<B>" are used to adjust the white balance of channel B.

4 Turn the MENU knob to move the ➡ mark to the item you want to set, then push MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

5 Turn the MENU knob to change the setting, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.
To continue setting other items, repeat steps **4** and **5**.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

5-3-4 Specifying an Offset for the Auto White Balance Setting

By setting an offset for the value of auto white balance, you can make the picture warmer or colder.
The OFFSET WHT page of the OPERATION menu allows you to make this setting.

1 Holding down the MENU knob, move the MENU ON/OFF switch from OFF to ON.

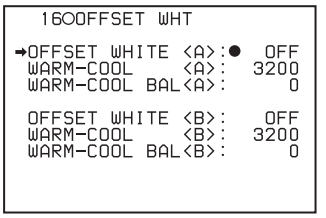
The TOP menu appears.

2 Turn the MENU knob to move the ➡ mark to OPERATION, then push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page appears. If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, push the MENU knob once, and turn the MENU knob to move the ➡ mark to OFFSET WHT. Then push the MENU knob to display the OFFSET WHT page.
If a different page is displayed, turn the MENU knob until the OFFSET WHT page appears, then push the MENU knob to select that page.

The current setting of each item appears on the right of the item.



Item	Description
OFFSET WHITE <A>	Turns the setting of the offset for channel A ON or OFF. ON: Adds the offset adjusted on this page to the white balance.
WARM-COOL <A>	When OFFSET WHITE <A> is ON, sets the offset for the white balance of channel A, using the color temperature. Adjust the value while looking at the real image because the error tends to be bigger for adjustment of high color temperature.
WARM-COOL BAL <A>	Adjusts the value more precisely if the adjustment by WARM-COOL <A> is not satisfactory.
OFFSET WHITE <B>	Turns the setting of the offset for channel B ON or OFF. ON: Adds the offset adjusted on this page to the white balance.
WARM-COOL <B>	Sets the offset for the white balance of channel B, using the color temperature. Adjust the value while looking at the real image because the error tends to be bigger for adjustment of high color temperature.
WARM-COOL BAL <B>	Adjusts the value more precisely if the adjustment by WARM-COOL <B> is not satisfactory.

4 Set the WHITE BAL switch to the position corresponding to the desired channel (A or B).

Note

If the WHITE BAL switch is not set to A or B when you operate the camcorder, the adjustment value will not be reflected in the output signal.

5 Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

6 Turn the MENU knob to change the setting, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

To continue setting other items of the same white balance channel, repeat steps **5** and **6**.
To set the other white balance channel, go back to step **4**.

7 To end the menu operation, set the MENU ON/OFF switch to OFF.

Note

When using the OFFSET WHITE function, "+" is displayed as the WARM color temperature indication and "-" is displayed as the COOL temperature indication in the viewfinder.

5-3-5 Assigning Functions to Assignable Switches

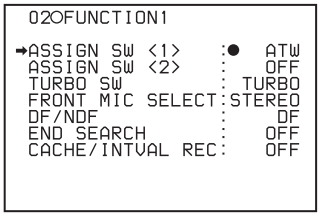
You can assign the desired function to the ASSIGN 1/2 switches and the TURBO GAIN button.

1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the FUNCTION 1 page appears, then push the MENU knob to select the page.

The current setting of each item appears on the right of the item.

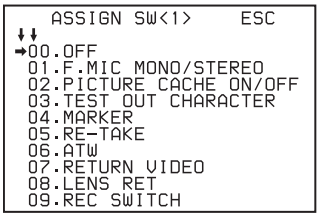


Item	Description
ASSIGN SW <1>	Assigns the function to ASSIGN 1 (push-type) switch.
ASSIGN SW <2>	Assigns the function to ASSIGN 2 (slide-type) switch.
TURBO SW	Assigns the function to the TURBO GAIN button.

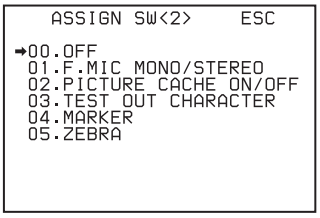
3 Turn the MENU knob to move the ➡ mark to the item corresponding to the switch to which you want to assign the function, then push the MENU knob.

The corresponding ASSIGN SW window appears.

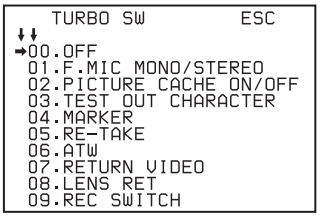
ASSIGN SW <1> window



ASSIGN SW <2> window



TURBO SW window



Functions to be assigned to the ASSIGN 1 (push-type) switch and the TURBO GAIN button

Function	Description
OFF	Disables the switch.
F. MIC MONO/ STEREO	Assigns the monaural/stereo switch function when a stereo microphone is connected to the MIC IN connector.
PICTURE CACHE ON/OFF [1)]	Assigns the Picture Cache mode ON/ OFF function.
TEST OUT CHARACTER	Assigns the function for switching whether or not text is superimposed on the video signal to be output from the TEST OUT connector.
MARKER	Assigns the ON/OFF function for displaying all markers.
RE-TAKE	Assign the RE-TAKE function that allows the camcorder to search for the cut most recently recorded and records the new cut over it.
ATW	Assigns the ON/OFF function of auto-tracing white balance.
RETURN VIDEO	Assigns the ON/OFF function for displaying the image of the return video signal on the viewfinder.[2)]
LENS RET	Assigns the same function as that of the RET button on the lens.
REC SWITCH	Assigns the VTR S/S (start/stop) function.
TURBO SWITCH	Assigns the TURBO GAIN function.
TELE-FILE MARK	Assigns the function to the Tele-File mark recording button.
ZEBRA	Assigns the zebra pattern display function.
5600K	Applies an electrical 5600K filter.
FREEZE MANUAL TRIG [3)]	Assigns the function for storing the picture from the camera as a freeze-frame picture manually.
UA01 to UA10 [4)]	Assigns the items assigned on the ASSIGN EDIT page.[5)]

1) The assigned function is effective only when an optional HKDW-703 is installed.
2) Even if the RETURN VIDEO item is set to "OFF" on the GENLOCK page of the MAINTENANCE menu, you can use this switch to display the image of the return video signal on the viewfinder.
3) The assigned function is effective only when an optional HKDW-905R is installed.
4) This does not appear if nothing is assigned in the ASSIGN EDIT menu.
5) To assign the items to the ASSIGN EDIT menu, use the USER MENU CUSTOMIZE menu.

Functions to be assigned to the ASSIGN 2 (slide-type) switch

Function	Content
OFF	Disables the switch.
F. MIC MONO/ STEREO	Assigns the monaural/stereo switch function when a stereo microphone is connected to the MIC IN connector.
PICTURE CACHE ON/OFF [1)]	Assigns the Picture Cache mode ON/ OFF function.
TEST OUT CHARACTER	Assigns the function for switching whether or not the characters are mixed with the video signal to be output from the TEST OUT connector.
MARKER	Assigns the ON/OFF function for displaying all markers.
ZEBRA	Assigns the zebra pattern display function.
CAM FREEZE SEL [2)]	Assigns the function for selecting the freeze-frame picture to be displayed on the viewfinder (picture from the camera or the freeze-frame picture stored to memory).
UA01 to UA10 [3)]	Assigns the items assigned in the ASSIGN EDIT page.

1) The assigned function is effective only when an optional HKDW-703 is installed.
2) The assigned function is effective only when an optional HKDW-905R is installed.
3) This does not appear if nothing is assigned in the ASSIGN EDIT page.

Note

For functions that are assigned to the ASSIGN 2 (slide-type) switch, you cannot change those settings

using other menus. The function assigned to the ASSIGN 2 switch takes precedence over the menu setting.

4 Turn the MENU knob to move the ➡ mark to the item you want to assign to the assignable switch, then push the MENU knob.

The setting is executed and the FUNCTION 1 page appears again.

To continue to assign a function to another assignable switch

Repeat steps **3** and **4**.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

To return to the FUNCTION 1 page

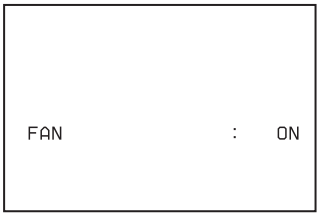
Turn the MENU knob to move the ➡ mark to ESC at the top right of the window, then push the MENU knob.

Operation of the assignable switches when UA01 to UA10 are assigned

The following shows an example of how to use the assignable switch to which the function registered in UA01 to UA10 on the ASSIGN EDIT page has been assigned. In the following example, the FAN ON/OFF function on the FUNCTION 3 page of the MAINTENANCE menu is assigned.

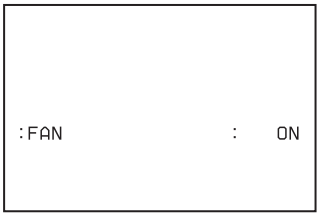
1 Push the corresponding assignable switch.

The item and the current setting are displayed on the viewfinder screen.

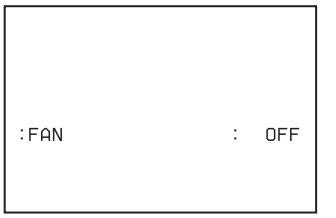


2 Push the MENU knob while the item and the current setting are displayed.

":" appears at the left of the item.



3 Turn the MENU knob to change the setting while ":" is displayed.



Viewfinder screen display

When the function is assigned to the ASSIGN 1 switch (push-type), the display disappears from the viewfinder screen 3 seconds after you perform the last operation. When the function is assigned to the ASSIGN 2 switch (slide-type), the display remains while the ASSIGN 2 switch is set to the ON position (slide it in the direction of the arrow). To make the display disappear, set the switch to OFF.

5-3-6 Setting the Date/Time of the Internal Clock

You can set or change the date and time of the internal clock. The date and time set are reflected in the time code.

1 Holding down the MENU knob, move the MENU ON/OFF switch to ON.

The TOP menu appears.

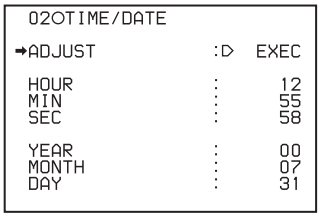
2 Turn the MENU knob to move the ➡ mark to "DIAGNOSIS," then push the MENU knob.

If this is the first time the DIAGNOSIS menu has been displayed, the CONTENTS page appears. If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, turn the MENU knob to move the ➡ mark to TIME/DATE, then push the MENU knob to display the TIME/DATE page. If a different page is displayed, turn the MENU knob until the TIME/DATE page appears, then push the MENU knob to select that page.

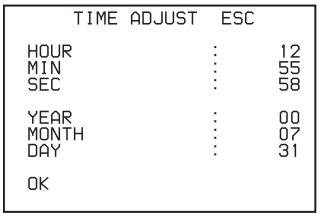
The ➡ mark moves to "ADJUST."

TIME/DATE page



4 Push the MENU knob.

The TIME ADJUST setting window appears.



Item	Description
HOUR	Sets the hour value.
MIN	Sets the minutes value.
SEC	Sets the seconds value.
YEAR	Sets the year.
MONTH	Sets the month.
DAY	Sets the day.

5 Turn the MENU knob to move the ➡ mark to the item you want to set, then push MENU knob.

The ➡ mark on the left of the selected item changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

6 Turn the MENU knob to display the desired value, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

7 To continue the remaining settings, repeat steps **5** and **6**.

8 When you finish making settings, turn the MENU knob to move the ➡ mark to OK, then push the MENU knob.

The internal clock is set with the date and time set in steps **5** to **7**. The TIME/DATE page of the DIAGNOSIS menu appears again. The time set on the TIME ADJUST setting window is displayed.

To cancel the setting

Before executing step **8**, move the ➡ mark to ESC at the top right of the window then push the MENU knob. Alternatively, push the CANCEL/PRST / ESCAPE switch down to the ESCAPE side.
All settings or changes are discarded and the TIME/DATE page of the DIAGNOSIS menu appears.

5-3-7 Selecting a Lens File

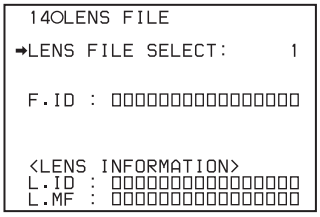
The LENS FILE page of the USER menu allows you to change the lens file according to the lens in use.

1 Set the MENU ON/OFF switch to ON.

The menu page accessed last appears on the viewfinder screen.

2 Turn the MENU knob until the LENS FILE page appears, then push the MENU knob to select the page.

The LENS FILE page shows the file name of the lens file currently selected.



3 Turn the MENU knob to move the ➡ mark to LENS FILE SELECT, then push the MENU knob.

The ➡ mark changes to a ● mark, and the ● mark changes to a ? mark.

4 Turn the MENU knob until the lens file No. in use appears, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

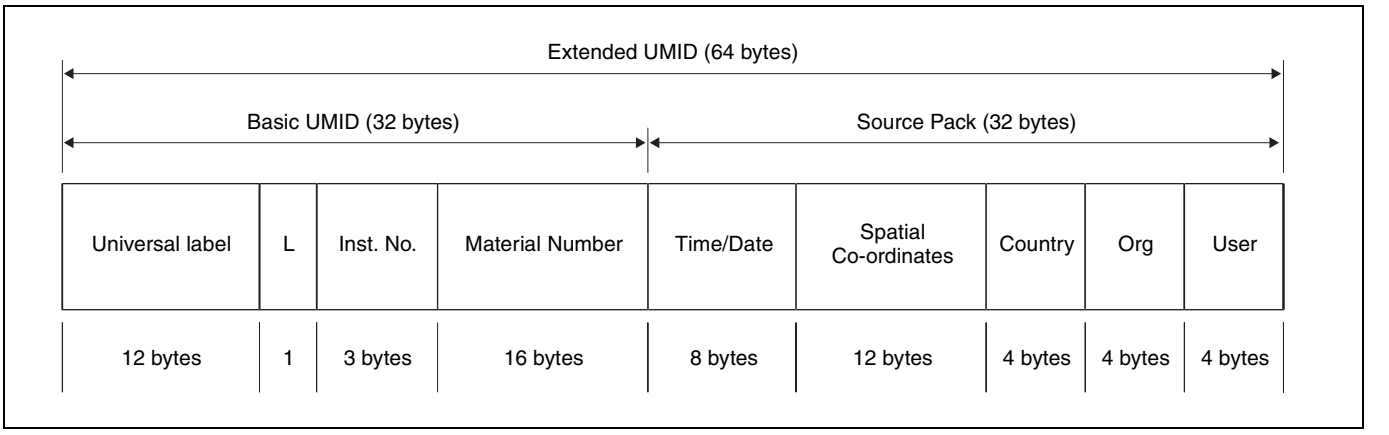
5-3-8 Using AMID Data

To perform operations from interviewing to editing effectively and to detect audio-visual materials easily when reusing them, metadata that provides additional information is recorded along with audio-visual data on a tape. As one of application of metadata, the UMID (Unique Material Identifier) is internationally standardized.

What is a UMID?

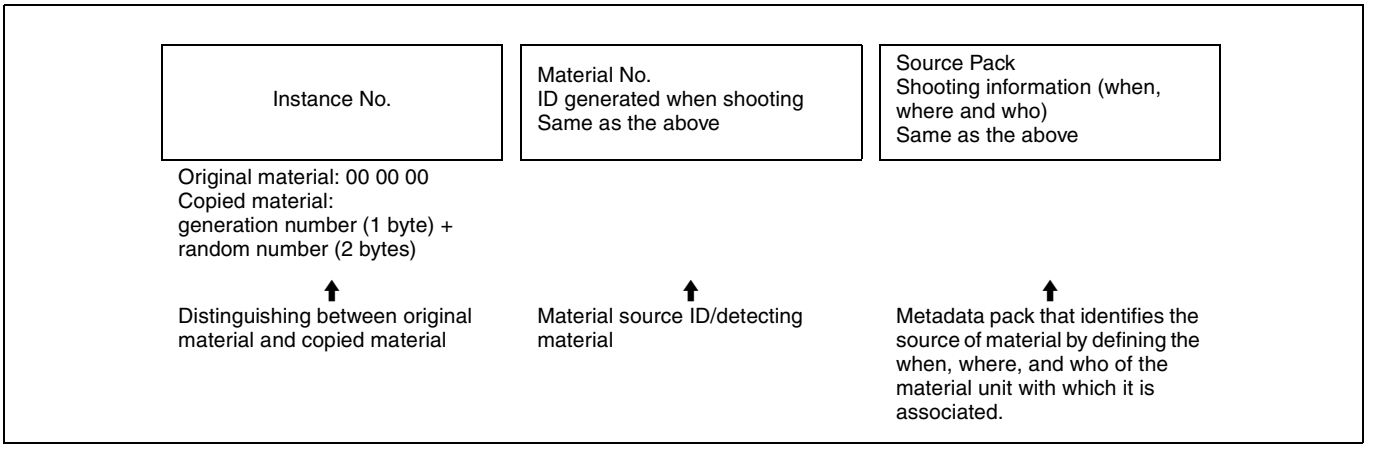
The UMID (Unique Material Identifier) is a unique identifier for audio-visual material defined by the SMPTE330M-2003 standard.
The UMID may be used either as the 32-byte Basic UMID or as the Extended UMID, which includes an additional 32 bytes of Source Pack to make a total 64 bytes.

For details, refer to SMPTE-330M.



A globally unique ID is automatically recorded at every shooting.
The Extended UMID is metadata that provides additional information, such as location, time/date, company, and so on.

The UMID is applied as follows:


Instance No.
Material No.
ID generated when shooting
Same as the above
Source Pack
Shooting information (when, where and who)
Same as the above
Original material: 00 00 00
Copied material:
generation number (1 byte) +
random number (2 bytes)
Distinguishing between original material and copied material
Material source ID/detecting material
Metadata pack that identifies the source of material by defining the when, where, and who of the material unit with which it is associated.

Using the Extended UMID

You have to enter a country code, organization code, and user code. Set the country code referring to the ISO-3166 table, and set the organization code and user code independently.

For details, see "UMID menu setup" on page 101.

Functions of UMID data

The UMID data enables the following:

- Addition of a globally unique ID to every shot of audio-visual material. The unique ID is used to detect the material source and to link it with the original source material.
- Distinguishing between original material and copied material. 00 is added to the Instance Number for original material.

- Recording based on the UTC. The UTC is used when recording the UMID. This enables uniform control of source material recorded all over the world based on the universal time code.
- Calculating the date difference among source materials. The source material is recorded based on the MJD (Modified Julian Date), which enables easy calculation of date difference among source materials.

UMID menu setup

The UMID SET page of the OPERATION menu allows you to make settings for UMID data.

1 Holding down the MENU knob, set the MENU ON/OFF switch from OFF to ON.

The TOP menu appears.

2 Turn the MENU knob to move the ➡ mark to "OPERATION," then push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page appears.
If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, turn the MENU knob to move the ➡ mark to UMID SET, then push the MENU knob.
If a different page is displayed, turn the MENU knob until the UMID SET page appears, then push the MENU knob.

The current setting appears on the right side of each item.

UMID SET page

```
  20OUMID SET

➡EX-OWNERSHIP REC:   OFF

 COUNTRY CODE    :  □□□□
 ORGANIZATION    :  □□□□
 USER CODE       :  □□□□
 INSTANCE NO     :   RND

 TIME ZONE : 00 : +00:00

 MACHINE :  □□□□□□□□□□□□
```

Item	Contents
EX-OWNERSHIP REC	Specifies whether to record the user data.
COUNTRY CODE	Sets the country code.
ORGANIZATION	Sets the organization code.
USER CODE	Sets the user code.
INSTANCE NO	Specifies how to generate the instance number.
TIME ZONE	Sets the time difference from UTC.
MACHINE	Displays the machine-specific number.

4 Turn the MENU knob to move the ➡ mark to the item you want to set, then push the MENU knob.

The ➡ mark to the left of the selected item changes to a ● mark, and the ● mark to the left of the setting changes to a ? mark.

5 Turn the MENU knob to change the setting of the selected item or to display the desired value, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

Additional information on the UMID SET menu items

EX-OWNERSHIP REC

Specify whether to record the user data.
ON: The user data (COUNTRY CODE, ORGANIZATION, and USER CODE) are recorded on the tape.
OFF: The user data are not recorded.

COUNTRY CODE

When you select COUNTRY CODE, the character table appears.
Enter an abbreviated alphanumeric string (4-byte alphanumeric strings) according to the values defined in ISO 3166-1.
There are about 240 country codes.
Find your own country code on the following home page.

Refer to ISO-3166-1:
http://www.din.de/gremien/nas/nabd/iso3166ma/codlstp1/en_listp1.html

For detailed information on how to enter characters, follow steps 3 to 6 in "5-2-8 Setting the Shot ID" on page 89.

When the country code is less than 4 bytes, the active part of the code will occupy the first part of the 4-bytes and the remainder must be filled with the space character (20h).

Example: In the case of Japan

For Japan, if the country code is JP, it is 2 bytes, if JPN, it is 3 bytes.
As a result, enter the following:
JP_ _
or
JPN _
where _ represents a space.

ORGANIZATION (organization code)

When you select this item, the character table appears. Enter an abbreviated 4-byte alphanumeric string for the organization code.

Note

There are no problems in recording or playing back audio-video signals, if ORGANIZATION is not set.
Organization codes must be acquired by applying to the SMPTE registration office. If no organization code has been acquired, it is forbidden to enter an arbitrary string. In this case, a rule, the code "00" must be entered. Freelance operators who do not belong to an organization should enter "~."

USER CODE

When you select this item, the USER CODE window appears.
Enter the 4-byte alphanumeric strings for user identification.
The user code is registered with each organization locally. It is usually not centrally registered.
When the user code is less than 4 bytes, enter the user code from the beginning of the 4 bytes and enter the space character (20h) in the remaining strings.
This user code is determined by the organization. The methods used depend on the organization.

Note

User bits cannot be entered when no organization code has been entered.

INSTANCE NO.

Select the method for generating the numbers to be used to identify original video images.
RND: Random
GEN: Generation (number of times of copy)
Ask the system administrator for advice.

TIME ZONE

When you select this item, the TIME ZONE window appears.
The UTC is calculated based on the local time, using the time zone. If the time zone is not set properly, the UTC will not be recorded correctly.

```
      TIME ZONE   ESC

  00.UTC          GREENWICH
  01.UTC-01:00    AZORES
  02.UTC-02:00    M-ATRANTIC
  03.UTC-03:00    ARZENTINE
  04.UTC-04:00    HALIFAX
  05.UTC-05:00    NEW YORK
  06.UTC-06:00    CHICAGO
  07.UTC-07:00    DENVER
→ 08.UTC-08:00    LOSANGELES
  09.UTC-09:00    ALASKA
```

Set the time difference from UTC. When setting summer time or daylight savings time, change the code to one which will advance the time by 1 hour.

Note

When you change the time zone, adjust the built-in clock to local time and turn the power of the camcorder off and then on again.

MACHINE

An identification number specific to the machine is displayed. This number cannot be set or modified by users.

5-3-9 Using the Hyper Gamma

The Hyper Gamma is a new set of transfer functions designed to be easy to use as previous gamma curve functions and to realize a natural tone in high contrast scenes by taking full advantage of the capacity and wide dynamic range of the Power Had CCD sensor.

1 Follow steps **1**, **2**, and **3** in *"5-3-3 Setting the Color Temperature Manually" on page 95* to display the GAMMA page of the PAINT menu, and then push the MENU knob.

2 Turn the MENU knob to move the ➡ mark to GAMMA SELECT, then push the MENU knob.

The ➡ mark on the left of GAMMA SELECT changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob until HG appears, then push the MENU knob.

As you turn the MENU knob, the type of gamma table changes in the following sequence: STD ⟷ HG.

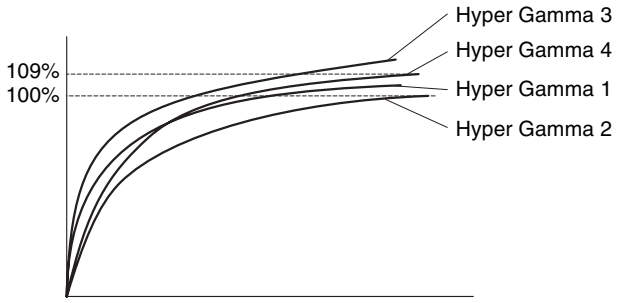
```
 04 GAMMA

 GAMMA              :    ON
 STEP GAMMA         :  0.45
 MASTER GAMMA       :     0
 R GAMMA            :     0
 G GAMMA            :     0
 B GAMMA            :     0
 OUTPUT SELECT      :     Y
→GAMMA SELECT       :?   HG
 GAM SEL(HG)        :     4
```

4 Turn the MENU knob to move the ➡ mark to GAM SEL (HG), then push the MENU knob.

5 Turn the MENU knob to select the hyper gamma table most suitable to the shooting conditions and purpose.

```
 04 GAMMA

 GAMMA              :    ON
 STEP GAMMA         :  0.45
 MASTER GAMMA       :     0
 R GAMMA            :     0
 G GAMMA            :     0
 B GAMMA            :     0
 OUTPUT SELECT      :     Y
 GAMMA SELECT       :    HG
→GAM SEL(HG)        :?    4
```

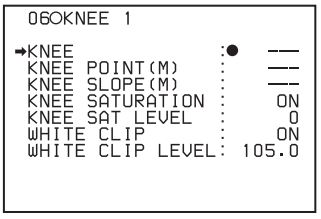
	White clip level: 100%	White clip level: 109%
Effective for shooting in low light scenes for better tonal reproductions of low-key areas (-3 dB Gain can be used for further noise reduction.)	Hyper Gamma 1	Hyper Gamma 3
Effective for shooting from low light to high contrast scenes (-3 dB Gain should not be used.)	Hyper Gamma 2	Hyper Gamma 4



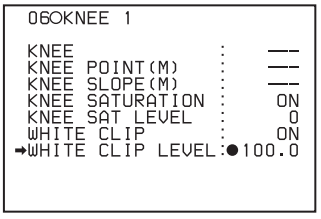
6 Push the MENU knob.

7 Change the white clip level to fit the hyper gamma selected in step **5**.

① Display the KNEE 1 page of the PAINT menu.



② Turn the MENU knob to move the ➡ mark to WHITE CLIP LEVEL, then push the MENU knob.



③ Turn the MENU knob until the corresponding white clip level appears, then push the MENU knob.

Note

You cannot change the settings related to KNEE functions when you use the hyper gamma function.

8 To end the menu operation, set the MENU ON/OFF switch.

When you select STD in step 3

The following gamma tables are available.

Setting	Gamma curve
1	Equivalent to SD ENG camcorder
2	Equivalent to SMPT-240M
3	Equivalent to ITU-709
4	Equivalent to GAIN50.

5-3-10 Using the Freeze Mix Function

When the HKDW-905R Slow Shutter and Image Inverter Board (not supplied) is installed, you can store the video from the camera as a freeze-frame picture to the memory on the board, and align the camera by mixing the stored freeze-frame picture with the video from the camera.

Settings to store the video from the camera as a freeze-frame picture

1 Holding down the MENU knob, set the MENU ON/OFF switch from OFF to ON.

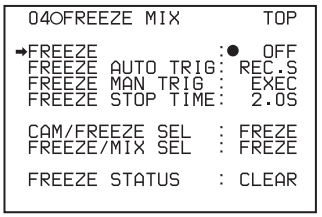
The TOP menu appears.

2 Turn the MENU knob to move the ➡ mark to OPERATION, then push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page appears.
If the menu has been used before, the page accessed last appears.

3 If the CONTENTS page is displayed, turn the MENU knob to move the ➡ mark to FREEZE MIX, then push the MENU knob.

If a different page is displayed, turn the MENU knob until the FREEZE MIX page appears, then push the MENU knob.
The current setting appears on the right side of each item.



Item	Contents
FREEZE	Specifies whether to store the video from the camera as a freeze-frame picture (ON) or not (OFF).
FREEZE AUTO TRIG	Specifies the method to store the freeze-frame picture automatically.
FREEZE MAN TRIG	When FREEZE AUTO TRIG is set to OFF, stores the freeze-frame picture manually.
FREEZE STOP TIME	Sets the duration of display of the freeze-frame picture when it is stored to memory.
CAM/FREEZE SEL	Specifies whether to display the video from the camera (CAM) or the freeze-frame picture stored to the memory (FREZ) on the viewfinder.
FREEZE/MIX SEL	When CAM/FREEZE SEL is set to FREZ, specifies whether to display only the freeze-frame picture stored to the memory on the board (FREZ) or mix the freeze-frame picture with the video from the camera (MIX) on the viewfinder.
FREEZE STATUS	Displays whether a freeze-frame picture is stored to the memory on the board (STORE) or not (CLEAR).

4 Turn the MENU knob to move the ➧ mark to FREEZE, then push the MENU knob.

The ➧ mark on the left of FREEZE changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

5 Turn the MENU knob to set FREEZE to ON, then push the MENU knob.

The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

Note

When FREEZE is set to OFF, the freeze-frame picture stored to memory is erased.

6 Turn the MENU knob to move the ➧ mark to FREEZE AUTO TRIG, then push the MENU knob.

The ➧ mark on the left of FREEZE AUTO TRIG changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

7 Turn the MENU knob to set the method to store the freeze-frame picture automatically.

As you turn the MENU knob, the setting changes in the following sequence: OFF ⟷ REC.S ⟷ REC.P.

To store the freeze-frame picture automatically

Turn the MENU knob to move the ➧ mark to REC.S or REC.P, then push the MENU knob.
The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.
When REC.S is selected, the picture at the beginning of recording is stored; when REC.P is selected, the picture at the end of recording is stored. In both cases, the picture is displayed on the viewfinder for the duration specified by FREEZE STOP TIME, then the picture is automatically stored to memory.
When the picture is stored, FREEZE STATUS indication changes from CLEAR to STORE.

To store the freeze-frame picture manually

Turn the MENU knob to move the b mark to OFF, then push the MENU knob.
The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

For details on procedure to store the picture manually, see "Storing the freeze-frame picture manually" on page 104.

8 If necessary, set the duration of display of the freeze-frame picture on the viewfinder when it is stored to memory.

① Follow steps **1**, **2**, and **3** in *"Settings to store the video from the camera as a freeze-frame picture" on page 103* to display the FREEZE MIX page of the OPERATION menu, and then push the MENU knob.

② Turn the MENU knob to move the ➧ mark to FREEZE STOP, then push the MENU knob.
The ➧ mark on the left of FREEZE STOP changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

③ Turn the MENU knob to set the duration, then push the MENU knob.
The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

Storing the freeze-frame picture manually

1 Follow steps **1**, **2**, and **3** in *"Settings to store the video from the camera as a freeze-frame picture" on page 103* to display the FREEZE MIX page of the OPERATION menu, and then push the MENU knob.

2 Turn the MENU knob to move the ➡ mark to FREEZE MAN TRIG, then push the MENU knob.

The ➡ mark on the left of FREEZE MAN TRIG changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob to move the ➡ mark to EXEC, then push the MENU knob.

The message "PICTURE FREZE OK? YES ➡ NO" appears.
At this time, the ➡ mark is on the left of flashing NO.

4 Turn the MENU knob to move the ➡ mark to YES (YES flashes at this time), then push the MENU knob.

The picture from the camera at the moment when the MENU knob is pressed is stored to memory as a freeze-frame picture.
The freeze-frame picture is displayed on the viewfinder for the duration specified by FREEZE STOP TIME, then the video from the camera resumes.
After the freeze-frame picture is stored, the FREEZE STATUS indication changes from CLEAR to STORE.

Note

When FREEZE is not set to ON, the freeze-frame picture will not be saved even if you press the MENU knob in step **4**. The message "FREEZE MODE IS OFF!" appears at this time.

Viewing the stored picture

1 Follow steps **1**, **2**, and **3** in *"Settings to store the video from the camera as a freeze-frame picture" on page 103* to display the FREEZE MIX page of the OPERATION menu, and then push the MENU knob.

2 Turn the MENU knob to move the b mark to CAM/FREEZE SEL, then push the MENU knob.

The ➡ mark on the left of CAM/FREEZE SEL changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

3 Turn the MENU knob to set CAM/FREEZE SEL to FREZE, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

4 Turn the MENU knob to move the ➡ mark to FREEZE/MIX SEL, then push the MENU knob.

The ➡ mark on the left of FREEZE/MIX SEL changes to a ● mark and the ● mark on the left of the setting changes to a ? mark.

5 Turn the MENU knob to set FREEZE/MIX SEL to FREEZE, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.
The freeze-frame picture stored to memory appears on the viewfinder.

Mixing the picture stored to memory with the video from the camera

1 Store the freeze-frame picture to memory.

2 2 Follow steps **1**, **2**, **3**, and **4** in *"Viewing the stored picture" on page 105*.

3 Turn the MENU knob to set FREEZE/MIX SEL to MIX, then push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.
The freeze-frame picture stored to memory and the video from the camera are mixed and displayed on the viewfinder.

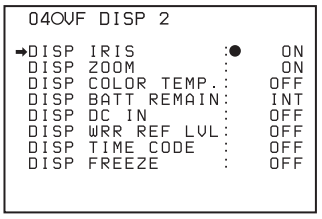
Distinguishing the freeze-frame picture from the mixed picture

When CAM/FREEZE SEL is set to FREZE, the picture on the viewfinder can be identified by the status indication (FREZ or MIX).

1 Follow steps **1** and **2** in *"Settings to store the video from the camera as a freeze-frame picture" on page 103.*

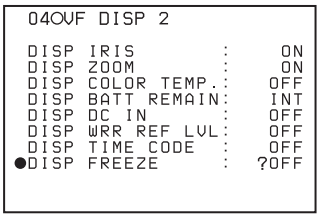
2 If the CONTENTS page is displayed, push and turn the MENU knob to move the b mark to VF DISP 2, then push the MENU knob.

If a different page is displayed, turn the MENU knob until the VF DISP 2 page appears, then push the MENU knob.
The current settings appear on the right side of each item.


04OVF DISP 2
➡DISP IRIS :● ON
DISP ZOOM : ON
DISP COLOR TEMP. : OFF
DISP BATT REMAIN : INT
DISP DC IN : OFF
DISP WRR REF LVL : OFF
DISP TIME CODE : OFF
DISP FREEZE : OFF

3 Turn the MENU knob to move the ➡ mark to DISP FREEZE, then push the MENU knob.

The ➧ mark on the left of DISP FREEZE changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.


04OVF DISP 2
DISP IRIS : ON
DISP ZOOM : ON
DISP COLOR TEMP. : OFF
DISP BATT REMAIN : INT
DISP DC IN : OFF
DISP WRR REF LVL : OFF
DISP TIME CODE : OFF
●DISP FREEZE : ?OFF

4 Turn the MENU knob to set DISP FREEZE to ON, then push the MENU knob.

The ● mark returns to a ➧ mark, and the ? mark returns to a ● mark.

methods used depend on the organization.

Notes

- When this unit is turned off, the freeze-frame picture stored to memory is erased.
- The freeze-frame picture stored to memory cannot be copied to the “Memory Stick”.
- The display of the freeze-frame picture is cancelled automatically right before the recording starts, and the video being recorded is displayed on the viewfinder.
- When SLOW SHUTTER is set to ON on the HKDW-905R Slow Shutter and Image Inverter Board (not supplied), the freeze-frame picture cannot be displayed. Also, while the freeze-frame picture is displayed on the viewfinder, the SLOW SHUTTER setting cannot be set to ON.
- When IMAGE INVERT is set to ON, the freeze-frame picture cannot be displayed. Also, while the freeze-frame picture is displayed on the viewfinder, the IMAGE INVERT setting cannot be set to ON.
- When Interval Rec function is activated, the freeze-frame picture cannot be displayed.
- While the freeze-frame picture is displayed, automatic adjustment of black balance and white balance cannot be carried out.
- While the freeze-frame picture is displayed, settings on certain functions cannot be verified. This is due to limitations of the Freeze Mix function and because of the limitations, functions which utilize analog circuits cannot be reflected to the freeze-frame picture display. For example, the results of gain value setting and the WHITE BAL switch settings cannot be verified on the freeze-frame picture.

5-4 Resetting USER Menu Settings to the Standard Settings

You can return all settings in the USER menu to the standard settings.

1 Holding down the MENU knob, set the MENU ON/OFF switch from OFF to ON.

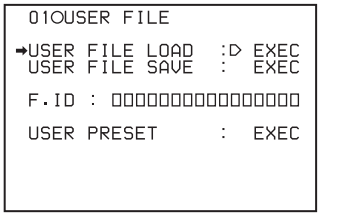
The TOP menu appears.

2 Turn the MENU knob to move the ➧ mark to FILE, then push the MENU knob.

If this is the first time the OPERATION menu has been displayed, the CONTENTS page appears.
If the menu has been used before, the page accessed last appears.

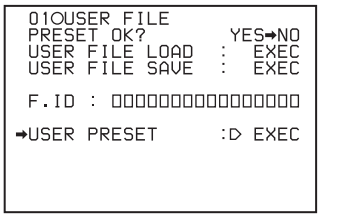
3 If the CONTENTS page is displayed, turn the MENU knob to move the ➧ mark to USER FILE, then push the MENU knob.
If a different page is displayed, turn the MENU knob until the USER FILE page appears, then push the MENU knob.

The current settings appear on the right side of each item.



4 Turn the MENU knob to move the ➧ mark to USER PRESET, then push the MENU knob.

The message “PRESET OK? YES ➧ NO” appears.



5 Turn the MENU knob to move the ➧ mark to YES, then push the MENU knob.

The settings for all items in the USER menu are reset to the standard settings.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

Chapter 6 Saving and Loading User Setting Data

6-1 Saving and Loading User Files

The camcorder is equipped with a “Memory Stick” drive, which enables you to save user files, scene files, lens files, reference files and “ALL” files. You can load these files from the “Memory Stick” for immediate recall of a particular setting configuration.
When a menu page is displayed, you can set up the camcorder so that inserting a “Memory Stick” automatically jumps to the appropriate file-related menu page.

For details about scene files, see “6-2 Saving and Loading Scene Files” on page 112.
For details of the function for jumping to the appropriate file-related menu page, see “6-3 Jumping to a File-Related Menu Page When Inserting a “Memory Stick”” on page 116.

“Memory Sticks” usable with this camcorder

With this camcorder, you can use “Memory Sticks” whose capacity does not exceed 128 MB.

For details, see “Memory Stick” in “Specifications” on page 143.

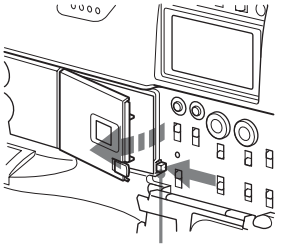
6-1-1 Handling the “Memory Stick”

The “Memory Stick” can be inserted to or removed from the camcorder with the power turned on or off.

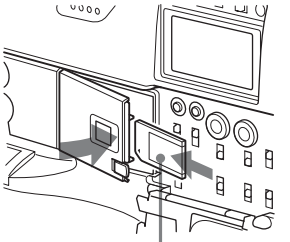
Inserting the “Memory Stick”

1 Push the MEMORY STICK OPEN button.

The cover of the “Memory Stick” compartment opens.



2 Hold the “Memory Stick” with the notch facing downward and the label side facing toward you, and insert the “Memory Stick” into the “Memory Stick” insertion slot until it clicks into place. Then close the cover.

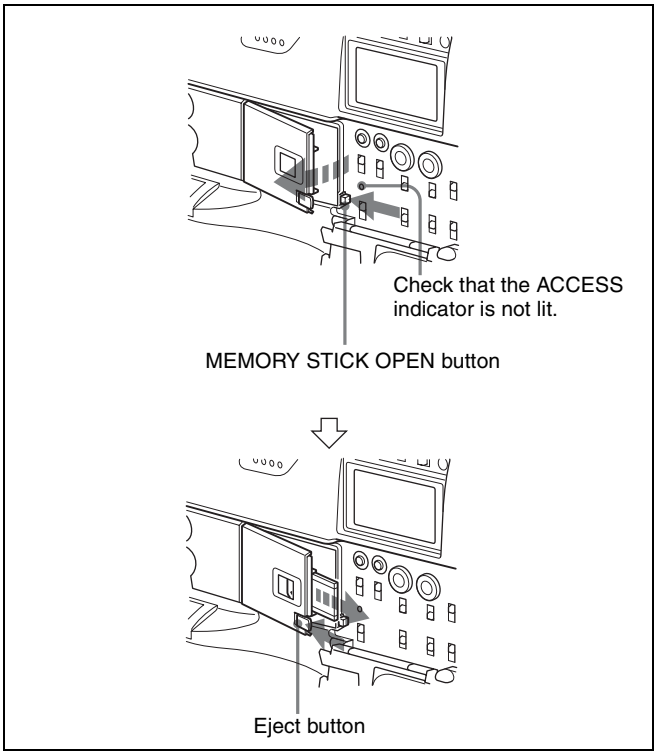


Note

If it does not fit into the slot properly or if there is some resistance when you insert it, the “Memory Stick” may be turned around or upside down. Do not force the “Memory Stick” into the slot. Confirm the direction of the notch and arrow on the “Memory Stick” before inserting the “Memory Stick,” and then try inserting it again.

Removing the “Memory Stick”

Press the MEMORY STICK OPEN button to open the cover of the “Memory Stick” compartment.
Push the eject button after confirming that the ACCESS indicator is not lit. The “Memory Stick” pops out.

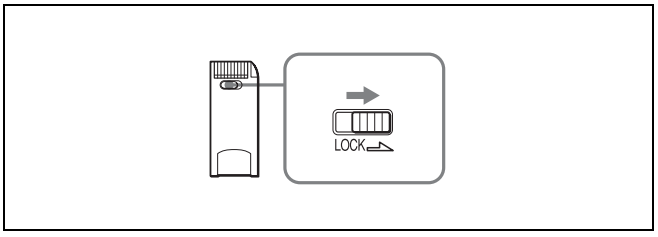


Note

Do not remove the “Memory Stick” while the ACCESS indicator is lit. You may lose data or damage the “Memory Stick.”

Protecting saved data

To prevent accidental erasure of important setup data, use the LOCK switch on the “Memory Stick.”
Slide the switch right to the write protect position. The message “MEMORY STICK LOCKED” is displayed. This ensures that you cannot inadvertently overwrite data on the “Memory Stick.”



Notes on using and storing the “Memory Stick”

- Avoid touching the connector of the “Memory Stick” or contacting it with a metal object.
- When attaching a label to the “Memory Stick,” use only the label supplied for the “Memory Stick.”
- Do not drop, bend, or submit the “Memory Stick” to external shock.
- Do not disassemble or modify the “Memory Stick.”
- Avoid getting liquids on the “Memory Stick.”
- Avoid using or storing the “Memory Stick” in a location subject to:
  —extremely high temperature such as the hot inside of a car or the outdoors exposed to a burning sun, or a place near a heater
  —direct sunlight
  —high humidity
  —excessive dust
- When storing and carrying the “Memory Stick,” keep it in its original case to ensure protection of important data.
- When carrying the camcorder with the “Memory Stick” inserted, close the cover of the menu operating section.
- Avoid removing the “Memory Stick” from the insertion slot while the access indicator is lit.
- Do not format the “Memory Stick” using a PC.
- Formatting of the “Memory Stick” can be performed on the MEMORY STICK page of the FILE menu *(page 167)*.

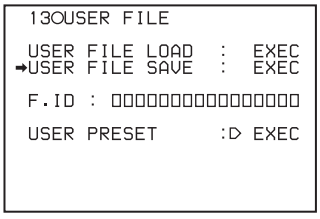
6-1-2 Saving USER Menu Data (User File) to the “Memory Stick”

You can save USER menu settings held in the camcorder as user files in the “Memory Stick.”
You can save up to 100 user files in the “Memory Stick.”
Insert the “Memory Stick,” then proceed as follows:

1 Set the MENU ON/OFF switch to ON.

The last accessed menu page appears on the viewfinder screen.

2 Turn the MENU knob until the USER FILE page appears, then push the MENU knob to select the page.

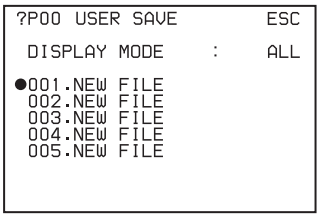


If you want to set a file ID for the data to be saved
Set the file ID before going to step **3**.

For details on setting the file ID, see “Setting the file ID” on page 110.

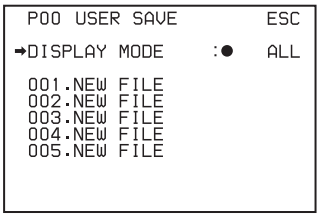
3 Turn the MENU knob to move the ➡ mark to USER FILE SAVE, then push the MENU knob.

The USER SAVE page appears.



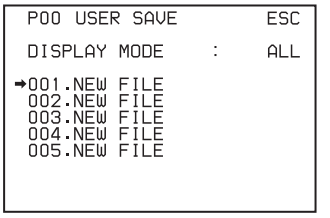
When a ? appears on the left of "P00" at the top left of the page, you can change the page. Up to 20 pages, from P00 to P19, can be used to save user files in the "Memory Stick." Each page can hold up to 5 files.

4 Turn the MENU knob until the page that contains the desired file number appears, then push the MENU knob.



5 Turn the MENU knob to move the ➡ mark to the desired file number, then push the MENU knob.

When a file number is shown as "NEW FILE," this means that the file is empty. When data is stored in a file number, the file name appears.



The ACCESS indicator lights.
When the saving is completed, the message "COMPLETE" appears and the ACCESS indicator goes off.

If you select a file number where data has already been saved

The message "OVER WRITE OK? YES ➡ NO" appears. In this case, the ➡ mark appears on the left of "NO," which is flashing.

- To stop overwriting, push the MENU knob.
- To overwrite, move the ➡ mark to YES, then push the MENU knob.

You can select the information displayed on each USER SAVE or USER LOAD page by changing the DISPLAY MODE setting.

For details, see "Selecting the display contents" on page 111.

6 To end the menu operation, set the MENU ON/OFF switch to OFF.

The menu disappears from the viewfinder screen, and the display indicating the current status of the camcorder appears along the top and bottom of the screen.

USER menu settings to be saved in the "Memory Stick"

Settings for items on all pages of the USER menu are saved in the "Memory Stick" as a user file. However, you can select saved data that are not to be loaded from the "Memory Stick" by using the items LOAD CUSTOM DATA, LOAD OUT OF USER, BEFORE FILE PAGE and USER LOAD WHITE on the USER FILE2 page of the FILE menu.

If data cannot be saved

If one of the following error messages appears during or after the save operation, then the data was not saved.

Data save error messages

Error message	Cause	Action
NO MEMORY STICK (flashing)	No "Memory Stick" is inserted.	Insert or reinsert the "Memory Stick."
MEMORY STICK LOCKED	The LOCK switch on the "Memory Stick" is set to the write protect position.	Set the LOCK switch to the write enable position.
MEMORY STICK ERROR (flashing)	Circuit or "Memory Stick" fault.	Check the circuitry, or replace the "Memory Stick".

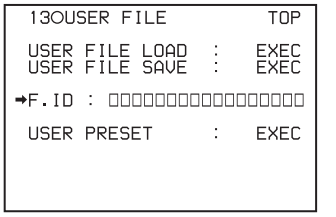
Setting the file ID

Before data is saved to a "Memory Stick," it is useful to set a file ID for the "Memory Stick" to identify it.
When data is saved to a "Memory Stick," the file ID is saved to the "Memory Stick" together with the data.

Note

Set the file ID before saving data in the "Memory Stick." Otherwise, the file ID is not saved with the other data.

1 On the USER FILE page, turn the MENU knob to move the ➡ mark to F. ID.



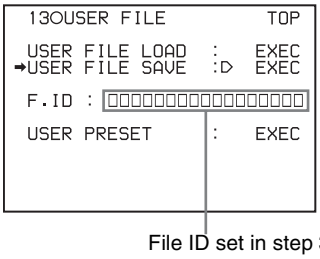
2 Push the MENU knob.

A character table appears, allowing you to select characters you want to enter.

3 Follow the procedure of steps **4** and **5** described in *"5-2-8 Setting the Shot ID" (page 89)* to enter the file ID.

4 When you finish entering the file ID, turn the MENU knob to move the ▼ mark to END, then push the MENU knob.

The entered file ID is now displayed.



After setting the file ID, follow the procedure from step **3** in *"6-1-2 Saving USER Menu Data (User File) to the "Memory Stick"" (page 109)*.

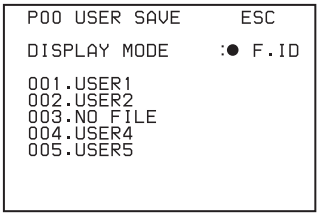
The set file ID is saved in the "Memory Stick" with the data.

Selecting the display contents

You can select the contents of the file to be displayed on the USER SAVE page and USER LOAD page (P01 to P19).

1 Turn the MENU knob to move the ➡ mark to DISPLAY MODE, then push the MENU knob.

2 Turn the MENU knob to move the ➡ mark until the desired type of the display contents (see the following table) appears, then push the MENU knob.



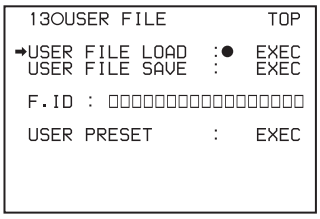
Display type	Description
ALL	File ID (10 characters) and date (month/day/year)
F.ID	File ID (16 characters)
DATE	Saved date (year/month/day/hours/minutes/seconds)
MODEL	Information on the model

6-1-3 Loading Saved Data from a "Memory Stick"

Note

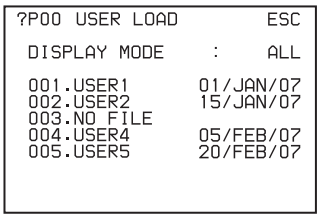
The data loaded from the "Memory Stick" overwrites the data saved in the camcorder.

1 Turn the MENU knob to move the ➡ mark to USER FILE LOAD on the USER FILE page.

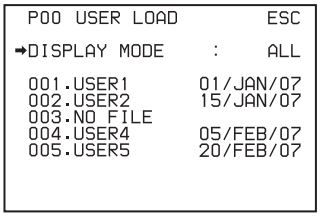


2 Push the MENU knob.

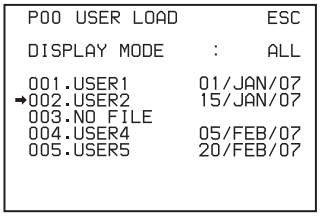
The USER LOAD page appears.



3 Turn the MENU knob until the page that contains the desired file number appears, then push the MENU knob.



4 Turn the MENU knob to move the ➡ mark to the desired file number to be loaded, then push the MENU knob.



The ACCESS indicator lights.

When the load is completed, the message “COMPLETE” appears and the ACCESS indicator goes off.
The USER FILE page appears again.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

If data cannot be loaded

If one of the following error messages appears during or after the load operation, then the data was not loaded.

Data load error messages

Error message	Cause	Action
NO MEMORY STICK (flashing)	No “Memory Stick” is inserted.	Insert or reinsert the “Memory Stick.”
MEMORY STICK ERROR (flashing)	Circuit or “Memory Stick” fault.	Recheck, and consult your Sony representative.
OTHER MODEL’S FILE (flashing)	The “Memory Stick” contains data that cannot be loaded into this camcorder.	Do not try to load data saved from another camcorder.

6-2 Saving and Loading Scene Files

You can save various settings for shooting a particular scene as a scene file. Loading the scene file, you can quickly recreate setup conditions suitable for the scene. You can save up to five scene files in the camcorder memory and up to 100 scene files in a “Memory Stick.” You can also load data from the “Memory Stick” into the camcorder memory.

Data that can be saved in a scene file

You can save the following data in a scene file:
- Values adjusted using the PAINT menu (except the items that return to the default values when power is on, such as OUTPUT SELECT)
- Shutter speed settings made in the standard mode and ECS mode

The white balance data can be loaded only when the SCENE WHITE DATA setting on the REFERENCE page of the FILE menu is ON.

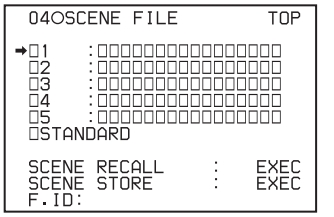
6-2-1 Saving a Scene File

To save a scene file in the “Memory Stick,” insert the “Memory Stick” before starting the operation.

1 In the TOP menu, select the FILE menu.

2 Turn the MENU knob until the SCENE FILE page appears, then push the MENU knob to select the page. Alternatively, select SCENE FILE on the CONTENTS page to display the SCENE FILE page.

SCENE FILE page

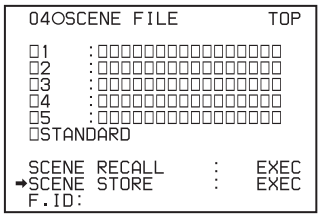


If you want to set a file ID for the data to be saved

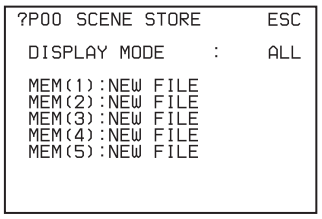
Set the file ID before going to step **3**.

For details on setting the file ID, see “Setting the file ID” on page 114.

3 Turn the MENU knob to move the ➜ mark to SCENE STORE, then push the MENU knob.



The SCENE STORE page appears.



4 Select the desired file number.

When no "Memory Stick" has been inserted

Turn the MENU knob to move the ➡ mark to the desired file number, then push the MENU knob. When the save is completed, the SCENE FILE page appears again.

When you select a file number where data has already been saved

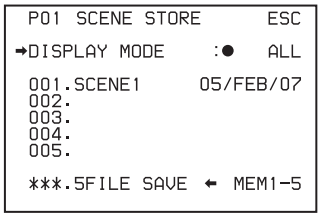
The message "OVER WRITE OK? YES ➡ NO" appears. In this case, the ➡ mark is placed on the left of "NO."

- To stop overwriting, push the MENU knob.
- To overwrite, move the ➡ mark to "YES," then push the MENU knob.

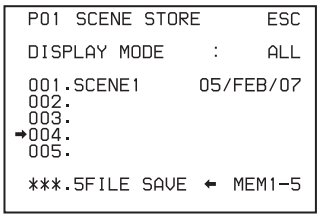
When a "Memory Stick" has been inserted

You can use up to 20 pages, from P01 to P20, to save scene files in the "Memory Stick." Each page can hold up to 5 files.

① Turn the MENU knob until the page which contains the desired file number appears, then push the MENU knob.



② Turn the MENU knob to move the ➡ mark to the desired file number, then push the MENU knob.



You can select the contents of the user file to be displayed on the page.

For details, see "Selecting the display contents" on page 114.

5 To end the menu operation, set the MENU ON/OFF switch to OFF.

To return to the SCENE FILE page

After the message "COMPLETE" is displayed, move the ➡ mark to ESC at the top right of the page by turning the MENU knob, then push the MENU knob.

White balance setting data to be saved in the scene file

The white balance setting data selected when you save the scene file is saved. For example, when the WHITE BAL switch is set to A, the adjusted values in memory A are saved in the scene file, and when the WHITE BAL switch is set to PRST, the preset value is saved.

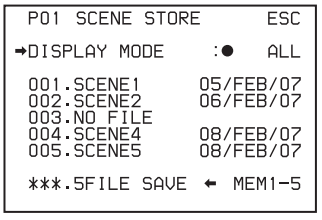
Saving scene files from the camcorder memory to the "Memory Stick"

You can save five scene files from the camcorder to the "Memory Stick" in a single operation.

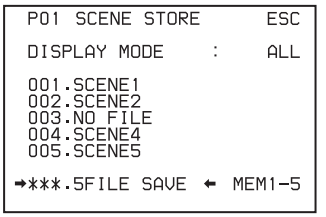
1 After displaying the SCENE FILE page turn the MENU knob to move the ➡ mark to SCENE STORE, then push the MENU knob.

One of the SCENE STORE pages appears.

2 Turn the MENU knob until the desired SCENE STORE page appears, then push the MENU knob.



3 Turn the MENU knob to move the ➡ mark to 5FILE SAVE ⬅ MEM1-5, then push the MENU knob.



When the save is completed, the message "COMPLETE" appears.

4 To end the menu operation, set the MENU ON/OFF switch to OFF.

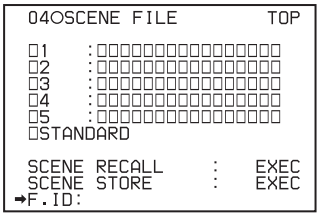
Note

If files have been saved in the page selected in step **2**, those files are replaced with files loaded from the camcorder memory. For example, files from 001 to 005 are replaced.

Setting the file ID

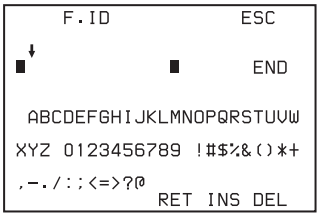
Before the data is saved as a scene file, it is useful to set a file ID to identify it. The set file ID is saved together with the data.

1 On the SCENE FILE page, turn the MENU knob to move the ➡ mark to F. ID.



2 Push the MENU knob.

A character table appears, allowing you to select characters you want to enter.



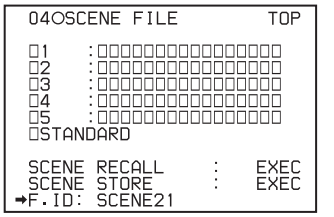
3 Follow steps **4** and **5** in *"5-2-8 Setting the Shot ID" (page 89)* to enter the file ID.

Note

Set the file ID before saving the scene file in the "Memory Stick" or the camcorder memory. Otherwise, the file ID is not saved with the other data.

4 When you finish entering the file ID, turn the MENU knob to move the ➡ mark to END, then push the MENU knob.

The SCENE FILE page appears again.



Follow the procedure from step **3** in *"6-2-1 Saving a Scene File" (page 112)*.
The set file ID is saved together with the data.

Selecting the display contents

You can select the items of file information to be displayed on the SCENE STORE pages (P01 to P20) or the SCENE RECALL pages (P01 to P20) used for saving data to or loading data from a "Memory Stick."

For details, see "Selecting the display contents" on page 111.

6-2-2 Loading a Scene File

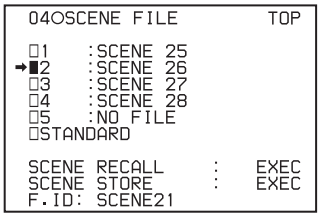
1 In the TOP menu, select the FILE menu.

2 Turn the MENU knob until the SCENE FILE page appears, then push the MENU knob to select the page. Alternatively, on the CONTENTS page select SCENE FILE, then push the MENU knob to display the SCENE FILE page.

3 Load a scene file.

To load a scene file stored in the camcorder

Turn the MENU knob to move the ➡ mark to the desired file number, then push the MENU knob.
The □ which is displayed on the left of the file number changes to ■.
The camcorder is set up according to the loaded scene file.



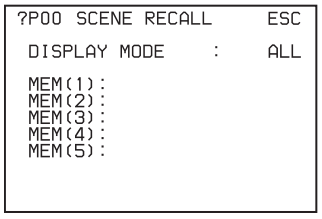
To cancel the selected scene file

Move the ➡ mark to ■, then push the MENU knob. ■ changes to □.
The camcorder returns to the settings before selecting this scene file.

To load a scene file saved in the "Memory Stick"

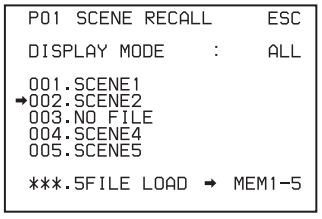
① Turn the MENU knob to move the ➡ mark to SCENE RECALL, then push the MENU knob.

The SCENE RECALL page appears.



② Turn the MENU knob until the page that contains the desired file number appears, then push the MENU knob.

③ Turn the MENU knob to move the ➡ mark to the desired file number, then push the MENU knob.



When loading is completed, the message "COMPLETE" appears.
If no file is present with a particular file number, this is shown as "NO FILE."

4 To end the menu operation, set the MENU ON/OFF switch to OFF.

Loading scene files from a "Memory Stick" into the camcorder memory

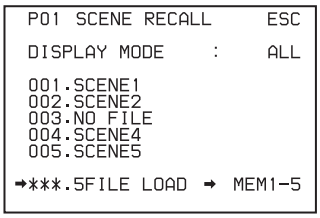
You can load up to five scene files stored in the "Memory Stick" into the camcorder memory in a single operation.

1 After displaying the SCENE FILE page, turn the MENU knob to move the ➡ mark to SCENE RECALL, then push the MENU knob.

A SCENE RECALL screen appears.

2 Turn the MENU knob until the page that contains the desired scene files appears, then push the MENU knob.

3 Turn the MENU knob to move the ➡ mark to 5FILE LOAD ➡ MEM 1-5, then push the MENU knob.



When loading is complete, the message "COMPLETE" appears and the ACCESS indicator goes off.

4 To end the menu operation, set the MENU ON/OFF switch to OFF.

Notes

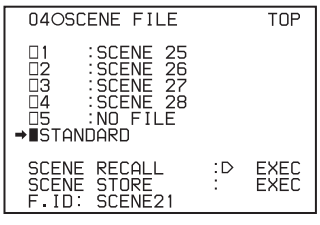
- The scene files loaded from the "Memory Stick" overwrite data saved in the camcorder memory.
- To load the scene file saved in the camcorder memory when the "Memory Stick" is inserted, return to the SCENE RECALL display and load the desired scene file in the camcorder memory.
- When there is no file to be loaded (shown as "NO FILE"), an existing file of the same number is unaffected. In the example shown in step **3**, MEM(3) is not overwritten.

6-2-3 Resetting the Camcorder Settings to the Standard Settings Saved in the Reference File

You can reset the settings of the camcorder to the settings saved in the reference file (standard settings).

For details about the items in the reference file, refer to the Maintenance Manual.

1 After displaying the SCENE FILE page, turn the MENU knob to move the ➡ mark to STANDARD, then push the MENU knob.



The □ displayed on the left of STANDARD changes to ■. The settings of the camcorder are reset to the settings saved in the reference file.

To cancel resetting

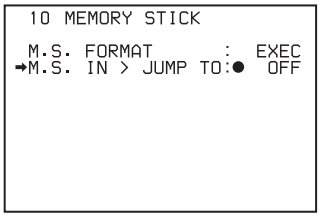
Push the MENU knob again while ■ is displayed. The operation is cancelled and the camcorder returns to the settings before STANDARD was selected.

6-3 Jumping to a File-Related Menu Page When Inserting a “Memory Stick”

A “Memory Stick” enables you to save user files, scene files, lens files, reference files and “ALL” files. The camcorder menu system allows you to make a setting so that when a “Memory Stick” holding these files is inserted while in menu operating mode, a menu page relating to the desired file is automatically displayed on the screen. This enables you to proceed to file operations quickly. This is very convenient especially when you manage data files using “Memory Sticks.”
The page to be displayed can be selected on the MEMORY STICK page of the FILE menu.

1 In the TOP menu, select the FILE menu.

2 Turn the MENU knob until the MEMORY STICK page of the FILE menu appears, then push the MENU knob to select the page. Alternatively, on the CONTENTS page select MEMORY STICK.



3 Turn the MENU knob to move the ➡ mark to M.S. IN > JUMP TO, then push the MENU knob.

The ➡ mark on the left of M.S. IN > JUMP TO changes to a ● mark, and the ● mark on the left of the setting changes to a ? mark.

4 Turn the MENU knob to select the desired setting (target FILE menu page).

Setting	Description
OFF	Disables this function.
USER	Jumps to the USER FILE page.
ALL	Jumps to the ALL FILE page.
SCENE	Jumps to the SCENE FILE page.
LENS	Jumps to the LENS FILE 1 page.
REFER	Jumps to the REFERENCE page.
USER1	Jumps to the USER 1 page.

5 Push the MENU knob.

The ● mark returns to a ➡ mark, and the ? mark returns to a ● mark.

Notes

In the following cases, jumping to the target page is impossible.

- When the power is turned on after you insert a “Memory Stick.”
- When OFF is selected for the M.S. IN > JUMP TO item.
- When any of the following menu pages is already displayed.
  - —A file-related page such as the USER FILE page of the FILE menu
  - —MEMORY STICK, ALL FILE, SCENE FILE, LENS FILE, REFERENCE FILE or ROM VERSION page

Setting Up the Camcorder

Chapter 7

7-1 Power Supply

The following power supplies can be used with the camcorder.
- BP-GL65/GL95/L60S Lithium-ion battery pack
- AC power using the AC-DN10 AC adaptor

7-1-1 Using a Battery Pack

When a BP-GL95 battery pack is used, the camcorder will operate continuously for about 110 minutes. When a BP-GL65 is used, the camcorder will operate continuously for about 80 minutes.
Before use, charge the battery pack with a BC-L70/M150 Battery Charger. It takes about 145 minutes to charge one BP-GL95.

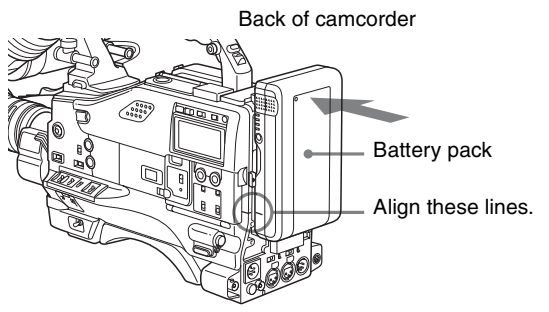
For details, refer to the battery charger operation manual.

Note on using the battery pack

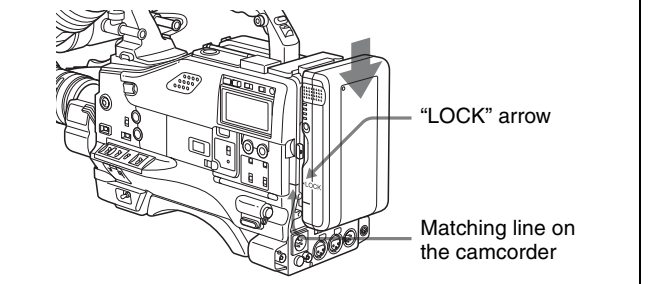
A warm battery pack may not be able to be fully recharged.

Attaching the battery pack

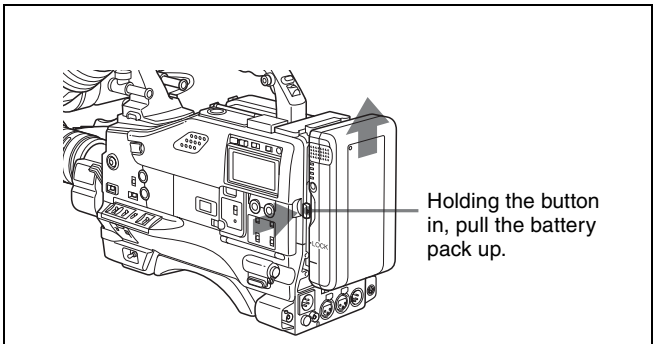
1 Press the battery pack against the back of the camcorder, aligning the line on the side of the battery pack with the matching line on the camcorder.



2 Slide the battery pack down until its “LOCK” arrow points at the matching line on the camcorder.



Detaching the battery pack



7-1-2 Avoiding Breaks in Operation Due to an Exhausted Battery

If you use both an internal battery pack (attached to the camcorder) and an external battery (connected to the DC IN connector) at the same time, you can avoid breaks in operation due to dead batteries.

When the external battery begins to fail and an internal battery pack is also used

Remove the DC output cable from the DC IN connector. The power source will switch to the internal battery pack.

When the external battery begins to fail and an internal battery pack is not used

First load the camcorder with a fully charged internal battery pack, then remove the DC output cable of the external battery from the DC IN connector. The power source will switch to the internal battery pack. To use an external battery again, connect a fully charged external battery to the DC IN connector before unloading the internal battery pack. The power source will switch to the external battery.

Continuous operation when operating with only an internal battery pack

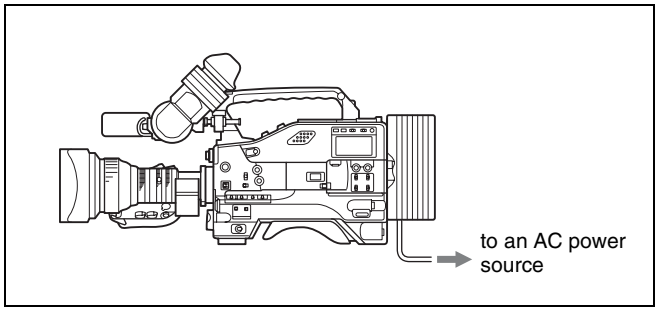
First, connect a fully charged external battery to the DC IN connector, then change the internal battery.

Notes

- When an internal battery pack is loaded and an external battery is connected to the DC IN connector, the external battery is always used as the power source.
- There may be some noise on the video signal at the instant the power sources are switched.

7-1-3 Using an AC Adaptor

Mount the AC-DN10 on the camcorder in the same way as a battery pack, then connect to the AC power supply. The AC-DN10 can supply up to 100 W of power.



7-1-4 Using the Anton Bauer Ultralight System

By fitting the camcorder with the Anton Bauer Ultralight system, and setting the LIGHT switch to AUTO, you can switch the light on and off automatically as you start and stop VTR operation. This system operates with lights powered by 12 V, with a maximum power consumption of 50 W.

7-2 Adjusting the Viewfinder

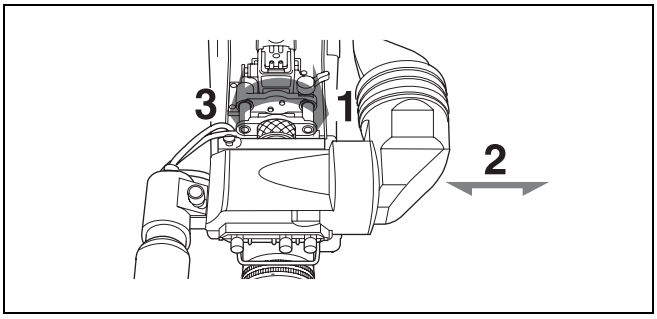
Note

When the viewfinder is attached, do not leave the camera (or the camcorder) with the eyepiece facing the sun. Direct sunlight can enter through the eyepiece, be focused in the viewfinder and cause fire.

For maximum viewing convenience, you can adjust the viewfinder position in the left-right and backward-forward directions.

7-2-1 Adjusting the Viewfinder Position

Adjusting the position to the right or left



1 Loosen the viewfinder left-right positioning ring.

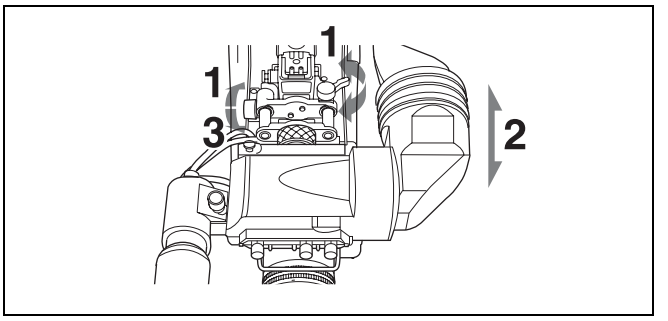
2 Adjust the viewfinder to the most convenient position for viewing by sliding it to the right or left.

3 Tighten the viewfinder left-right positioning ring.

To store the camcorder in the carrying case

Always store the camcorder with the viewfinder moved fully in the direction opposite to the barrel and the viewfinder left-right positioning ring tightened.

Adjusting the position backward or forward



1 Loosen the viewfinder front-rear positioning lever and the LOCK knob.

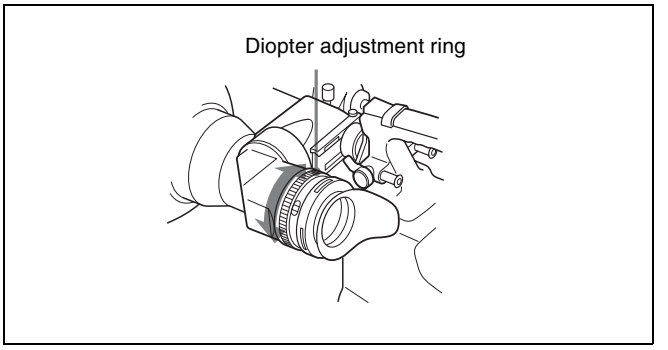
2 Adjust the viewfinder to the most convenient position for viewing by sliding it backward or forward.

3 Tighten the viewfinder front-rear positioning lever and the LOCK knob.

7-2-2 Adjusting the Viewfinder Focus and Screen

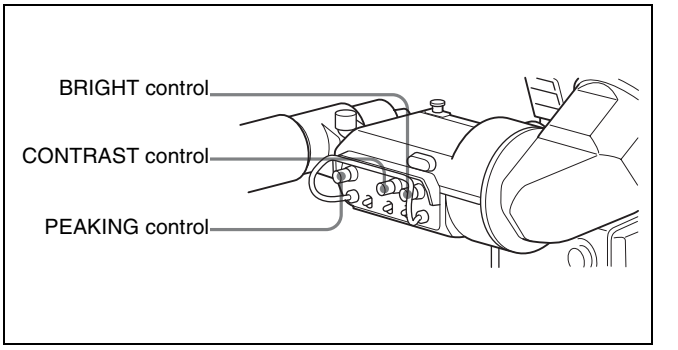
Adjusting the viewfinder focus

Turn the diopter adjustment ring until the viewfinder image is sharpest.

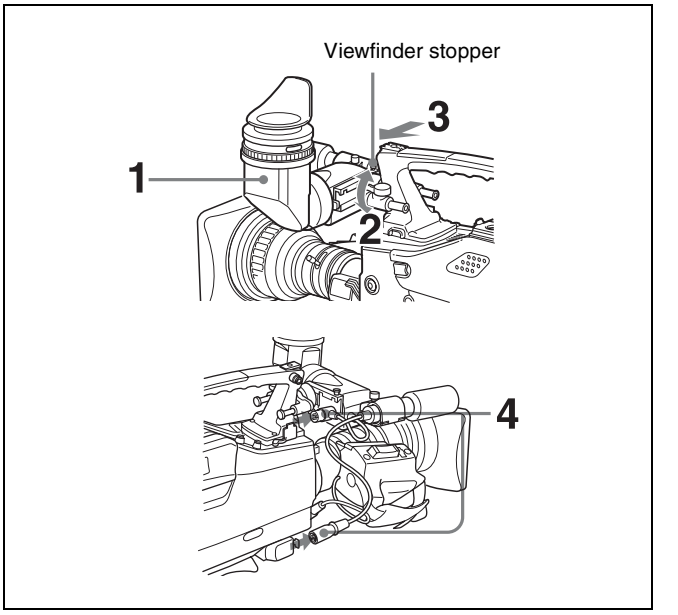


Adjusting the viewfinder screen

Adjust the brightness, contrast, and peaking of the viewfinder screen with the controls shown below:



7-2-3 Detaching the Viewfinder



1 Point the viewfinder barrel up or down.

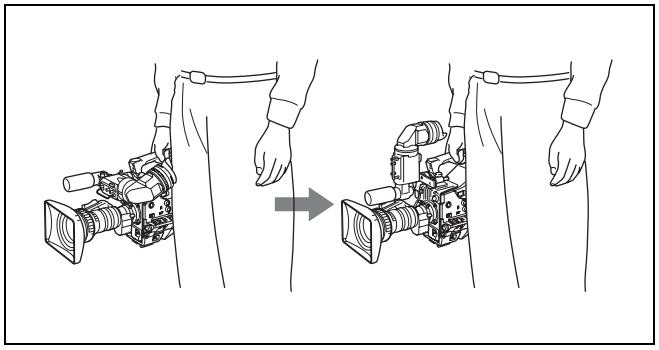
2 Loosen the viewfinder left-right positioning ring.

3 Holding the viewfinder stopper up, slide the viewfinder in the direction indicated by the arrow and detach it.

4 Remove the viewfinder cable and microphone cable from the clamps and disconnect them.

Using the viewfinder rotation bracket

By fitting a BKW-401 Viewfinder Rotation Bracket (not supplied), you can rotate the viewfinder out of the way so that your right leg does not hit the viewfinder while you are carrying the camcorder.

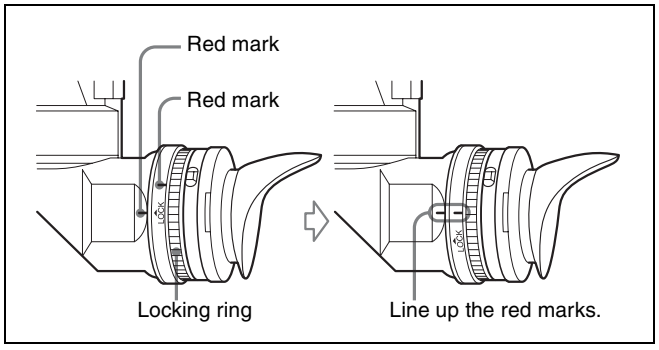


For more information, refer to the BKW-401 manual.

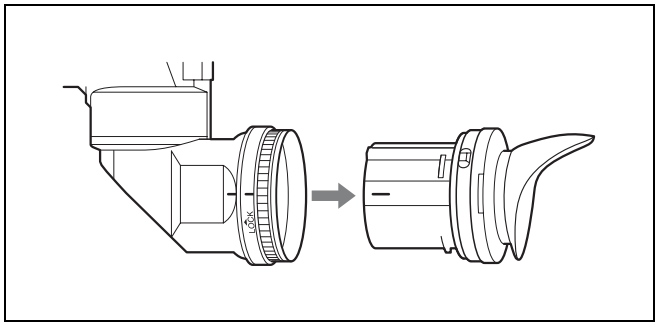
7-2-4 Detaching the Eyepiece

Removing the eyepiece gives a clearer view of the screen from further away. It is also easy to remove dust from the viewfinder screen and mirror when the eyepiece is detached.

1 Turn the eyepiece locking ring fully counterclockwise, to align the red marks on the locking ring and the viewfinder barrel.



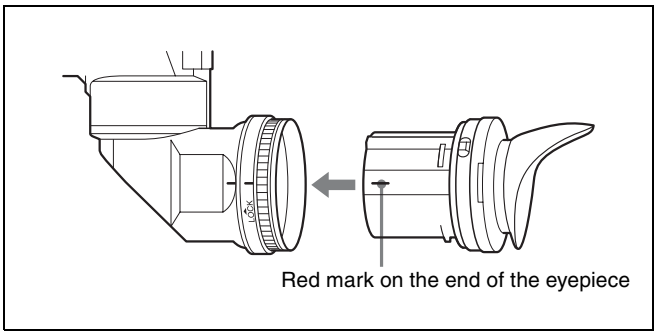
2 Detach the eyepiece.



To reattach the eyepiece

1 Align the red marks on the eyepiece locking ring and the viewfinder barrel.

2 Align the red mark on the end of the eyepiece end with the red marks on the eyepiece locking ring and the viewfinder barrel. Then insert the eyepiece into the viewfinder barrel.



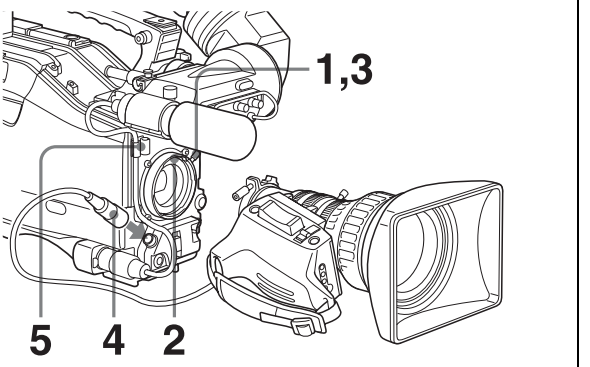
3 Turn the eyepiece locking ring clockwise until its "LOCK" arrow points at the red mark on the viewfinder barrel.

Note

When the eyecup is worn out, replace it with a new one (service part number 3-723-079-03).

7-3 Mounting the Lens

For information about using the lens, refer to the lens manual.



1 Push the lens mount lever upward and remove the lens mount cap from the lens mount.

2 Align the center slot in the lens mount with the center pin on the lens and insert the lens into the mount.

3 Holding the lens in place, push the lens mount lever downward to mount the lens.

Note

If the lens is not firmly locked, it may come off while the camcorder is being used. This could cause a serious accident. Make sure the lens is firmly locked.

4 Connect the lens cable to the LENS connector.

Note

Connecting a cable to the LENS connector while in powered status may cause a malfunction or damage the unit. Turn off the power before you make a connection with the LENS connector.

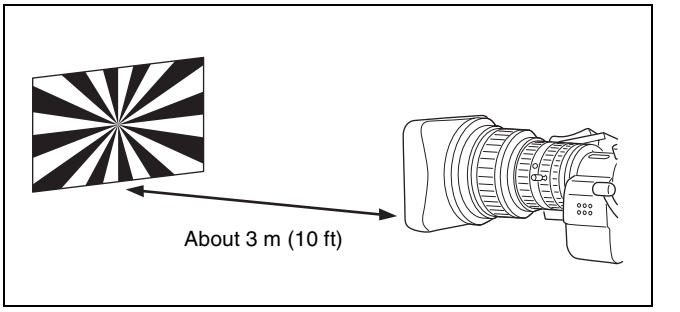
5 Secure the lens cable with the cable clamps.

7-4 Adjusting the Flange Focal Length

If the lens does not stay in focus properly as you zoom from telephoto to wide angle, adjust the flange focal length (the distance from the plane of the lens mounting flange to the imaging plane). Make this adjustment after mounting or changing the lens.

Adjusting the flange focal length

The position of the controls for adjusting the flange focal length vary somewhat from lens to lens. Check the identification of the various controls in the lens manual.



1 Set the iris to manual.

2 Open the iris. Place the flange focal length adjustment chart about 3 m (10 ft) away from the camera, lit well enough to provide a satisfactory video output level.

3 Loosen the fixing screws on the F.f or F.B ring (flange focal length adjustment ring).

4 Use manual or power zoom to set the lens to telephoto.

5 Point the camera at the chart by turning the focus ring and focus on it.

6 Set the zoom ring to wide angle.

7 Turn the F.f or F.B ring until the chart is in focus, being careful not to disturb the focus ring.

8 Repeat steps **4** to **7** until the chart stays in focus all the way from wide angle to telephoto.

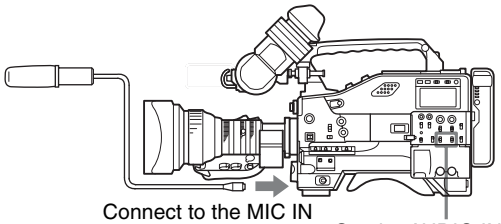
9 Tighten the F.f or F.B ring fixing screws.

7-5 Audio Input System

7-5-1 Using the Supplied Microphone

The camcorder's MIC IN connector is an XLR-5-pin (female), which you can use to attach the supplied stereo microphone.
You can use the supplied microphone either detached from or attached to the camcorder.

Using the microphone detached from the camcorder


Connect to the MIC IN connector.
Set the AUDIO IN CH-1/ CH-2/CH-3/CH-4 switches for the desired audio recording channel to FRONT or F.

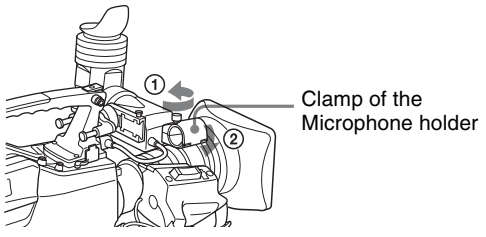
Note

When using the supplied microphone with an extension cable, always use an external power supply type cable.

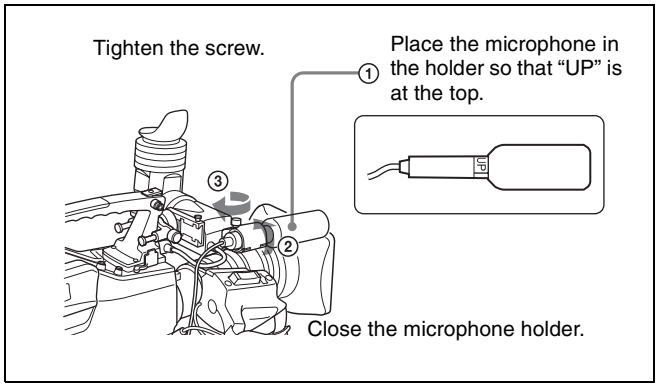
Using the microphone attached to the camcorder

When an optional HDVF-20A HD Electronic Viewfinder is used, attach the microphone as follows.

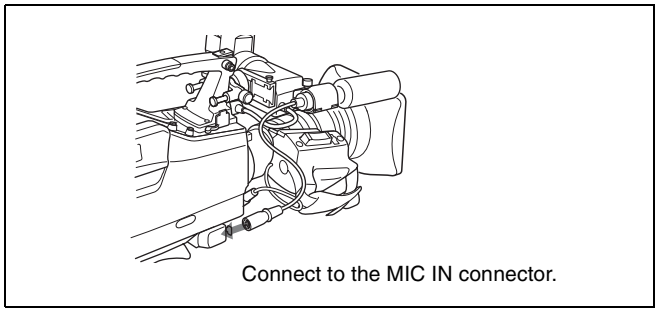
1 Loosen the screw and open the microphone holder clamp.



2 Place the microphone in the microphone holder.



3 Plug the microphone cable into the MIC IN connector, then set the AUDIO IN CH-1, CH-2, CH-3 and/or CH4 switch(es) for the desired recording channel to FRONT or F.



Recording stereo sound

You can record either stereo sound or monaural sound using the supplied stereo microphone.

To record stereo sound:

To record the L and R audio signals of stereo sound in channels 1 and 2, set both AUDIO IN CH-1 and CH-2 switches to FRONT.
To record the L and R audio signals of stereo sound in channels 3 and 4, set both AUDIO IN CH-3 and CH-4 switches to F.
Confirm that FRONT MIC SELECT on the FUNCTION 1 page of the USER menu is set to STEREO.
At the factory, the function of FRONT MIC SELECT is assigned to ASSIGN 2 (slide type). Slide the ASSIGN 2 switch to the front (lens side). If you have removed the FRONT MIC SELECT function from the ASSIGN 2 switch, set FRONT MIC SELECT to STREO on the FUNCTION 1 page of the USER menu (STREO is selected at the factory).

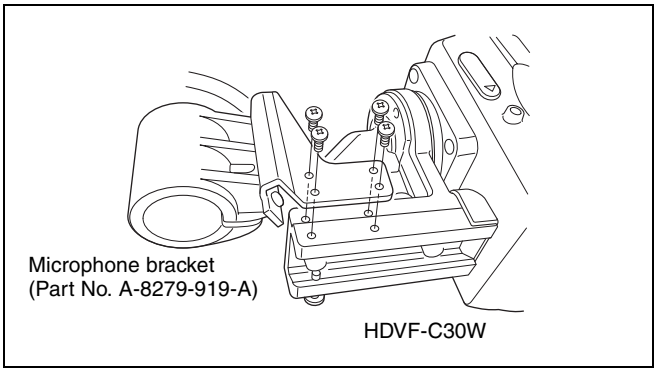
To record monaural sound:

Set the appropriate AUDIO IN CH-1, CH-2, CH-3 and/or CH-4 switch(es) corresponding to the channel(s) to which you want to record to FRONT or F.
Set the front microphone selection function to MONO.

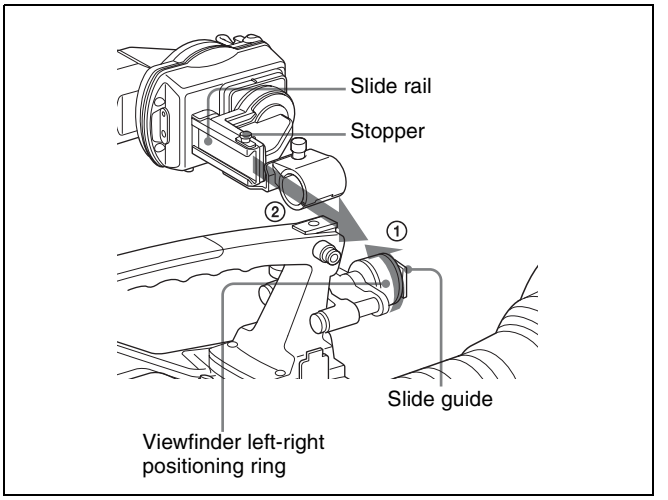
When an optional HDVF-C30W HD Electronic Viewfinder is used

The HDVF-C30W is not equipped with a microphone holder. Attach an optional microphone bracket (Part No. A-8279-919-A) to the HDVF-C30W first, then attach the supplied microphone.

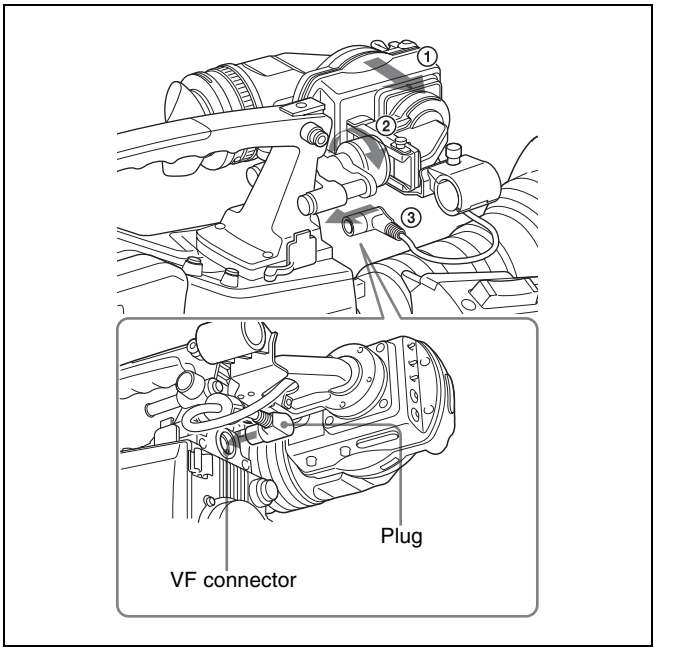
1 Attach the microphone bracket (Part No. A-8279-919-A) to the HDVF-C30W, using the 4 screws (+B2.6 x 6) supplied with the microphone bracket.



2 Loosen the viewfinder left-right positioning ring on the camcorder, and engage the slide rail on the viewfinder with the slide guide on the camcorder.



3 Position the viewfinder by sliding it from side to side, and tighten the viewfinder left-right positioning ring on the camcorder. Then connect the plug to the VF connector on the camcorder.



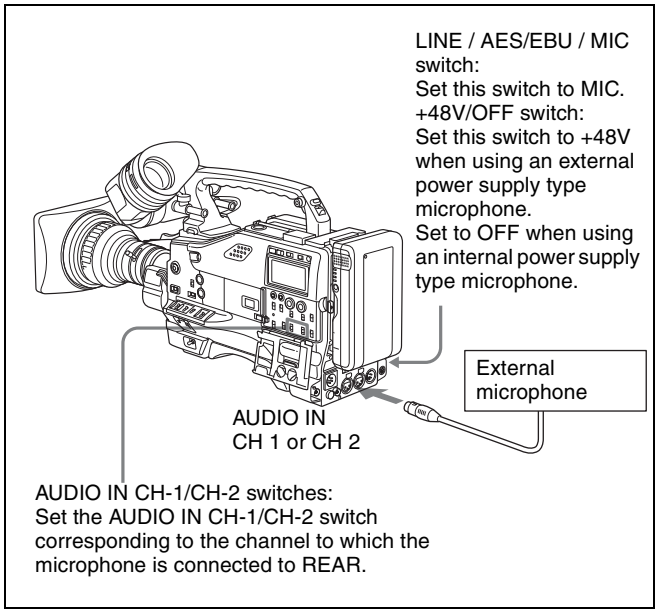
Note

When an HDVF-C30W is connected, “NG” or “– –” is displayed for EEPROM STATUS on the DEV STATUS page *(page 168)* of the DIAGNOSIS menu. However, this is not a malfunction.

7-5-2 Using an External Microphone

You can connect up to two external microphones using the AUDIO IN CH1 and CH2 connectors.
Set the LINE / AES/EBU / MIC switch to MIC.
When using a condenser microphone that requires external power (phantom power), set the +48 V/OFF switch to +48 V.
If the microphone being used does not require external power (dynamic microphone), set the +48 V/OFF switch to OFF.

Using a detached external microphone


LINE / AES/EBU / MIC switch:
Set this switch to MIC.
+48V/OFF switch:
Set this switch to +48V when using an external power supply type microphone.
Set to OFF when using an internal power supply type microphone.
External microphone
AUDIO IN CH 1 or CH 2
AUDIO IN CH-1/CH-2 switches:
Set the AUDIO IN CH-1/CH-2 switch corresponding to the channel to which the microphone is connected to REAR.

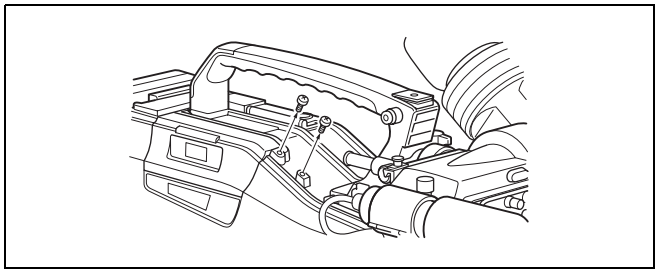
Note

In order for the AUDIO IN CH1 and CH2 connectors on the camcorder to be able to provide a phantom 48 V power supply, female XLR connectors (3-pin) are fitted. If the microphone cable has a female connector, use an adaptor.

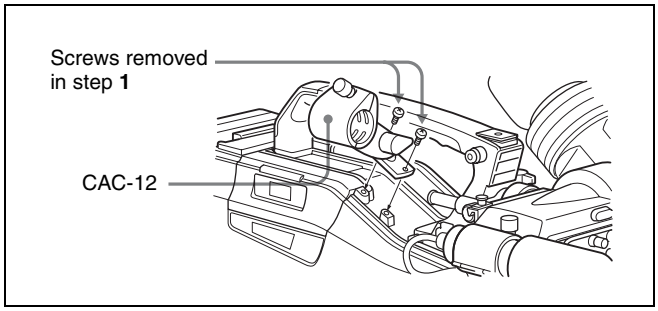
Using an external microphone attached to the camcorder

You can attach an external microphone to the camcorder using the optional CAC-12 microphone holder.

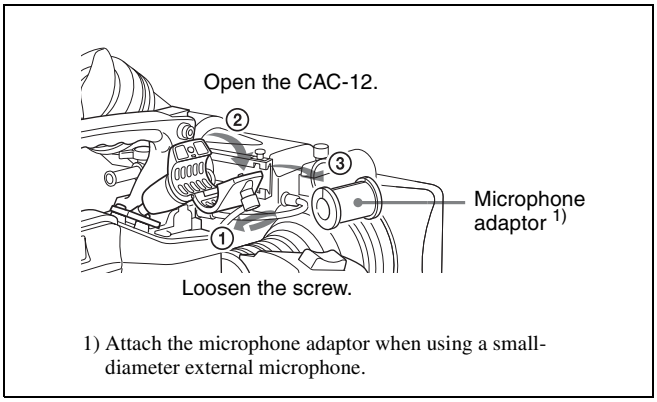
1 Remove the fixing screws for the external microphone holder.



2 Attach the CAC-12 Microphone Holder.

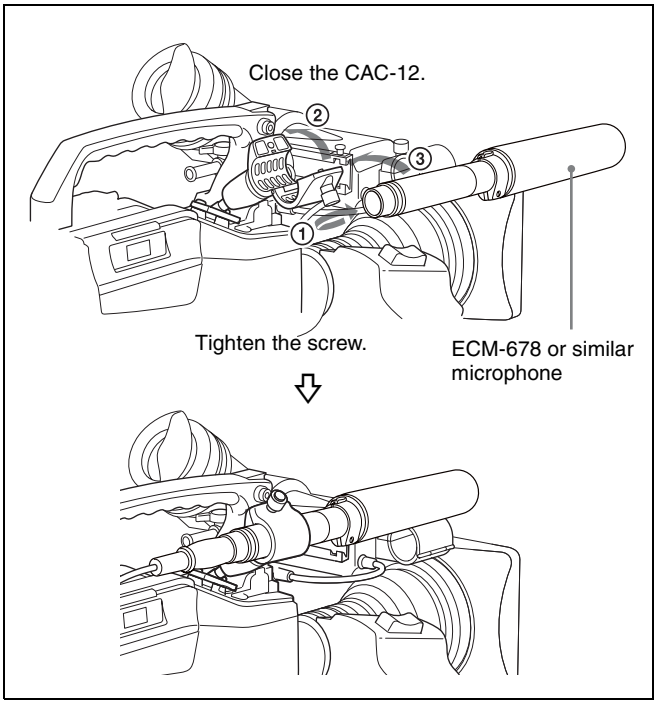


3 Open the CAC-12 and remove the microphone adaptor.



1) Attach the microphone adaptor when using a small-diameter external microphone.

4 Place an electret condenser microphone such as ECM-678 in the CAC-12.



5 Set the LINE / AES/EBU / MIC switch to MIC.
Set the +48 V/OFF switch to +48 V if you use an external power supply type microphone. Otherwise, set the switch to OFF.
Connect the microphone cable to the AUDIO IN CH1 or AUDIO IN CH2 connector.

Note

When you detach the CAC-12 Microphone Holder once you have attached it to the camcorder, be careful not to lose the two screws fixing the CAC-12. After detaching the CAC-12, be sure to put the two screws back into their original places *(see the figure illustrating the step **1** operation)*.

7-5-3 Attaching a UHF Portable Tuner (for a UHF Wireless Microphone System)

To use a Sony UHF wireless microphone system, attach one of the following UHF portable tuners.
- WRR-855A/855B UHF Synthesized Tuner Unit
- WRR-861A/861B/862A/862B UHF Portable Tuner.

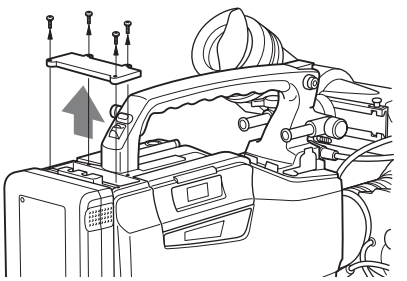
For each of these UHF portable tuners, use the following attachment procedure.

For details, refer to the UHF portable tuner manual.

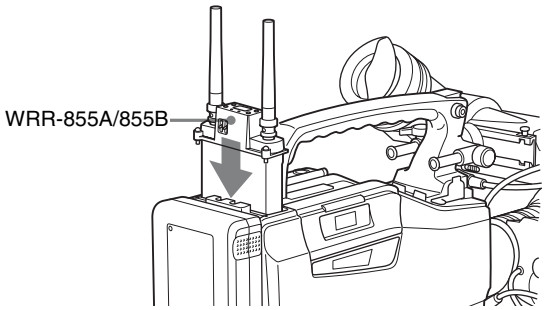
Fitting the WRR-855A/855B

You can use the WRR-855A/855B UHF Synthesized Tuner Unit simply by inserting it into the slot in the camcorder, and fastening the fixing screws.

1 Undo the four fixing screws holding the cover of the slot, and remove the cover.



2 Insert the WRR-855A/855B, and fasten the four fixing screws.



Set the AUDIO IN CH-1/CH-2/CH-3/CH-4 switches for the desired audio recording channel to WIRELESS or W.

For the operation of the WRR-855A/855B, refer to the manual supplied with the WRR-855A/855B.

Fitting the WRR-861A/861B/862A/862B (with a battery pack)

1 **(1)** Attach the WRR tuner fitting (not supplied, service part number: A-8278-057-A) to the back of the camcorder.

① Use a Phillips-type screwdriver to tighten the four screws placed in the tuner fitting. For three of these screws, insert the screwdriver through the corresponding hole and tighten the screw.

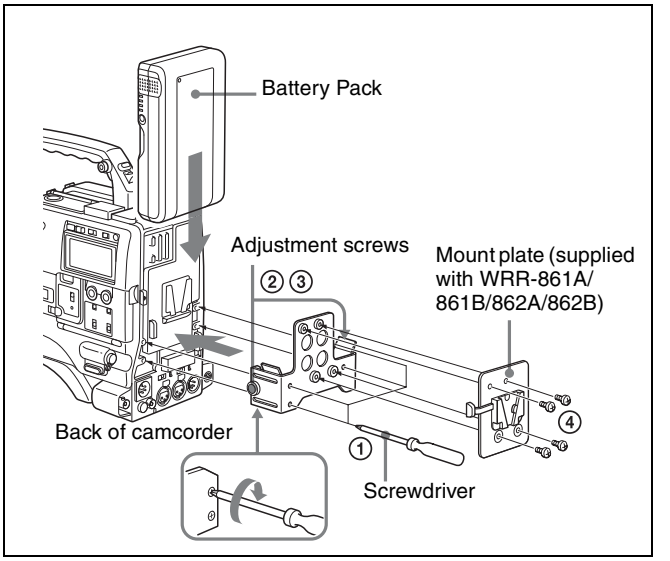
② Loosen the adjustment screws.

③ Adjust the tuner fitting position for a battery pack to be attached, and tighten the adjustment screws to fix its position.

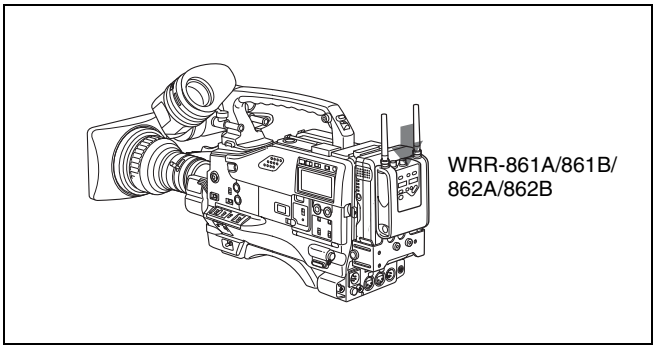
④ Attach the mount plate supplied with the WRR-861A/861B/862A/862B.

(2) Attach the battery pack.

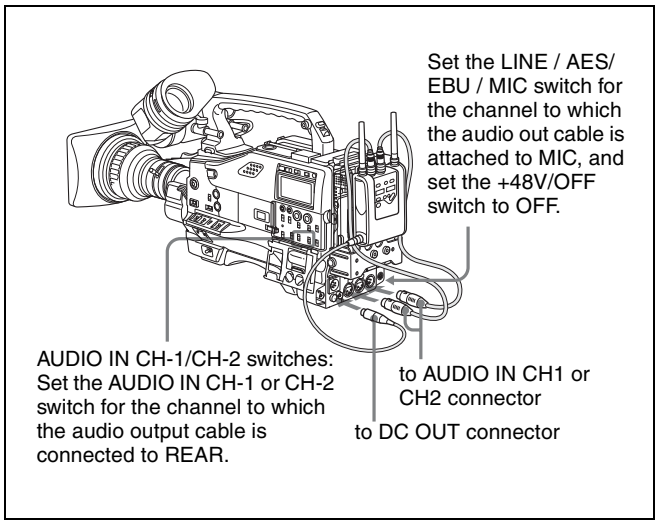
For details about attaching the battery pack, see "7-1-1 Using a Battery Pack" on page 118.



2 Mount the tuner on the WRR tuner fitting.

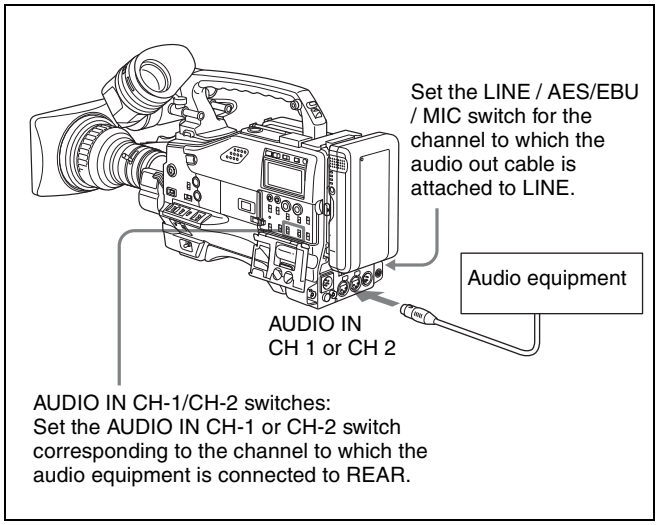


3 Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN CH1 or CH2 connector.


Set the LINE / AES/ EBU / MIC switch for the channel to which the audio out cable is attached to MIC, and set the +48V/OFF switch to OFF.
AUDIO IN CH-1/CH-2 switches: Set the AUDIO IN CH-1 or CH-2 switch for the channel to which the audio output cable is connected to REAR.
to AUDIO IN CH1 or CH2 connector
to DC OUT connector

7-5-4 Connecting Line Input Audio Equipment

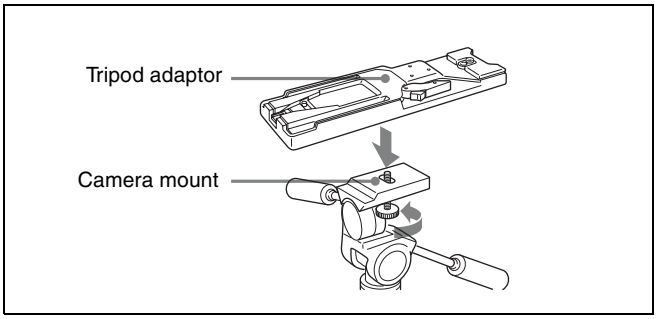
Connect the audio output connector of the audio equipment that supplies the line input signal to the AUDIO IN CH1 or CH2 connector.


Set the LINE / AES/EBU / MIC switch for the channel to which the audio out cable is attached to LINE.
Audio equipment
AUDIO IN CH 1 or CH 2
AUDIO IN CH-1/CH-2 switches: Set the AUDIO IN CH-1 or CH-2 switch corresponding to the channel to which the audio equipment is connected to REAR.

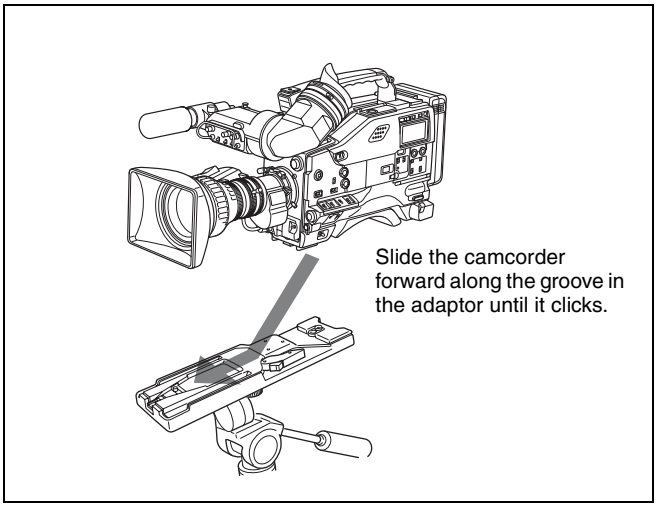
7-6 Tripod Mounting

You can easily mount and dismount the camcorder on a tripod by using the VCT-14 tripod adaptor (not supplied).

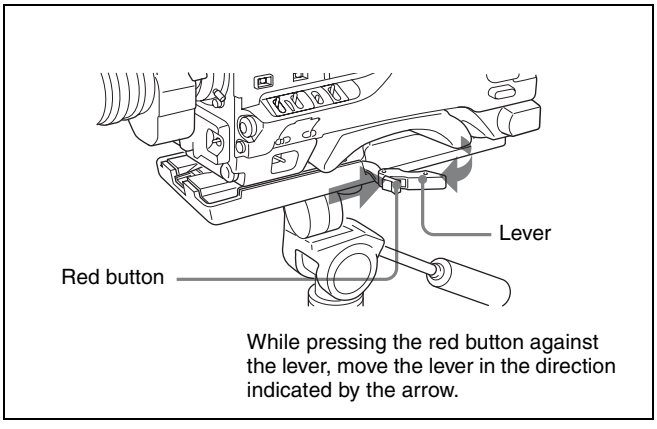
1 Attach the tripod adaptor to the tripod.



2 Mount the camcorder on the tripod adaptor.



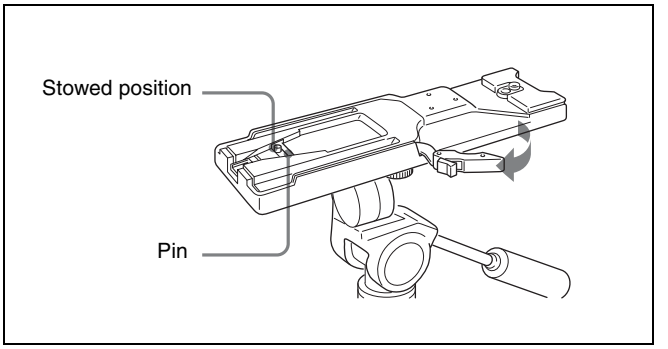
Removing the camcorder from the tripod adaptor



Note

The tripod adaptor pin may remain in the engaged position even after the camcorder is removed. If this happens, press

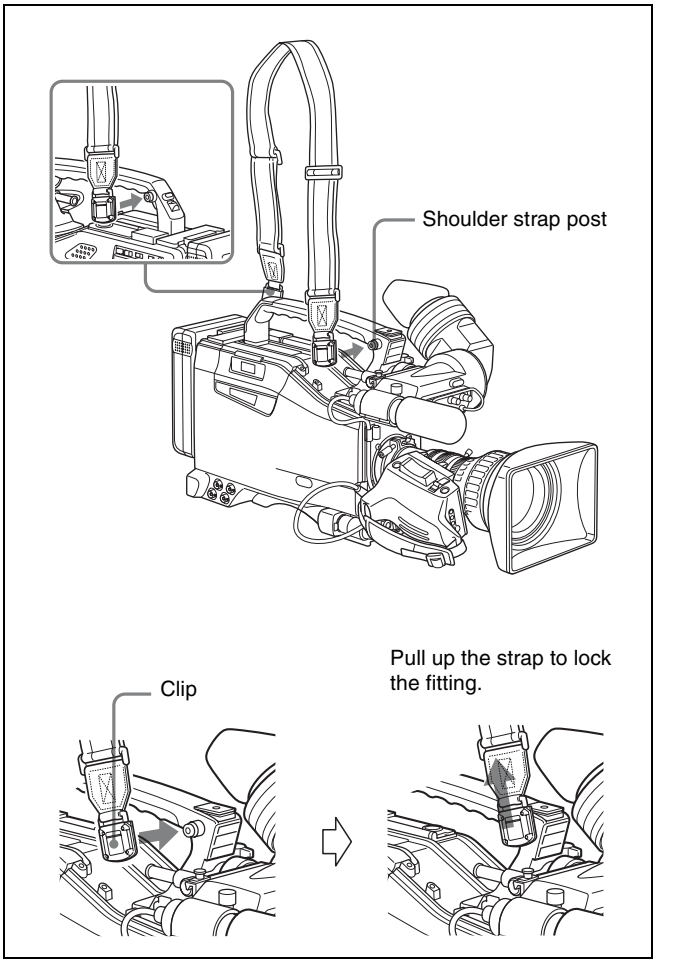
the red button against the lever a second time and move the lever as shown below until the pin returns to the stowed position. If the pin remains in the engaged position, you will not be able to mount the camcorder on the tripod adaptor.



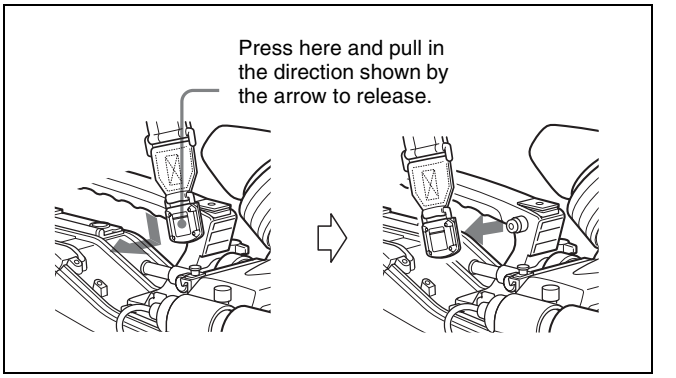
7-7 Attaching/Detaching the Shoulder Strap

Attaching the shoulder strap

Attach the supplied shoulder strap as shown below:

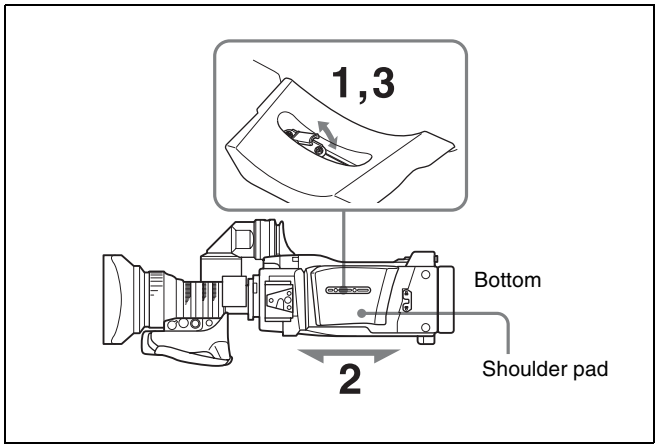


Removing the shoulder strap



7-8 Adjusting the Shoulder Pad Position

You can shift the shoulder pad from its center position (factory setting) backward by up to 10 mm (3/8 inch) or forward by up to 25 mm (1 inch). This adjustment helps you get the best balance for shooting with the camcorder on your shoulder.



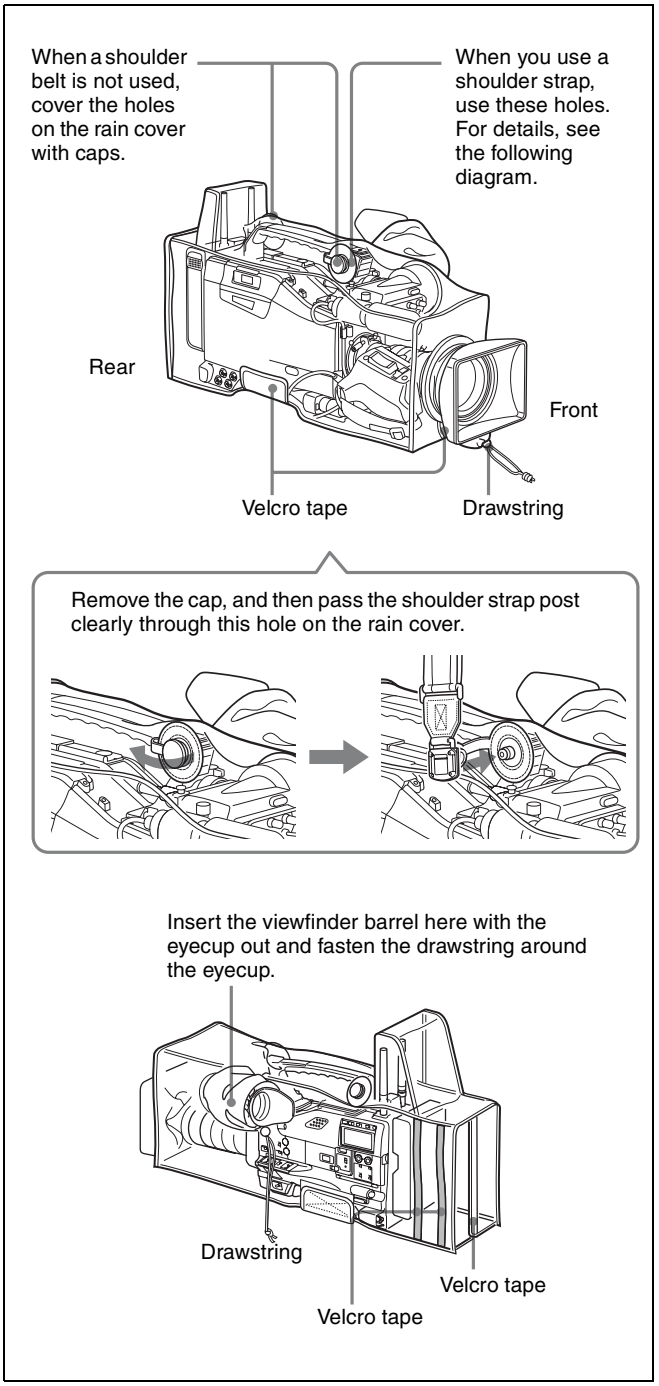
1 Raise the lever in the center of the shoulder pad to unlock the shoulder pad.

2 Slide the shoulder pad backward or forward until it is in the most convenient position.

3 Bring down the lever to lock the shoulder pad in the selected position.

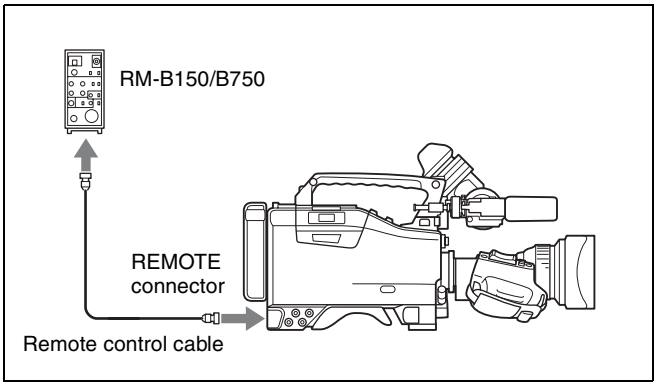
7-9 Attaching the Rain Cover (Not Supplied)

Attach the rain cover (part number 3-191-064-02) as illustrated below. You can insert and remove cassette tapes, operate various switches and controls, and mount the camcorder on the tripod adaptor with the rain cover attached.


When a shoulder belt is not used, cover the holes on the rain cover with caps.
When you use a shoulder strap, use these holes. For details, see the following diagram.
Rear
Front
Velcro tape
Drawstring
Remove the cap, and then pass the shoulder strap post clearly through this hole on the rain cover.
Insert the viewfinder barrel here with the eyecup out and fasten the drawstring around the eyecup.
Drawstring
Velcro tape
Velcro tape

7-10 Connecting the Remote Control Unit

Connecting an optional RM-B150/B750 Remote Control Unit enables remote control of the principal camera functions.
Connecting the remote control unit to the REMOTE connector (8-pin) automatically puts the camcorder into remote control mode. If you disconnect the remote control unit, the remote control mode is cancelled.



Camcorder switch functions when the remote control unit is connected

The following switches on the camcorder do not function.
- GAIN selector
- OUTPUT/DCC switch
- WHITE BAL switch
- AUTO W/B BAL switch
- SHUTTER selector
- TURBO GAIN button (ASSIGN 1 switch to which the TURBO GAIN function is assigned)
- VTR START button (VTR button on the lens and the ASSIGN 1 or the TURBO GAIN button to which the VTR START/STOP function is assigned) (When the VTR START/STOP item on the FUNCTION 3 page of the MAINTENANCE menu is set to RM.)

For details of the function of the VTR START button, see the item "Function of the VTR START button when the remote control unit is connected" on page 130.

Paint adjustment when the remote control unit is connected

If RM COMMON MEMORY is set to OFF on the FUNCTION 3 page of the MAINTENANCE menu, the settings of the paint adjustment that were in effect the last time the remote control unit was used are recalled.

Function of the VTR START button when the remote control unit is connected

You can select the function of the VTR START button on the camcorder when the remote control unit is connected, using the VTR START/STOP item on the FUNCTION 3 page of the MAINTENANCE menu.

To disable the camcorder VTR START button and the lens VTR button

On the FUNCTION 3 page of the MAINTENANCE menu, set VTR START/STOP to RM.
If the same function as that of the VTR START/STOP button is assigned to the ASSIGN 1 switch or the TURBO GAIN button, this setting also disables these controls.

To enable the camcorder VTR START button and the lens VTR button

On the FUNCTION 3 page of the MAINTENANCE menu, set VTR START/STOP to CAM or PARA.
If the same function as that of the VTR START/STOP button is assigned to the ASSIGN 1 switch or the TURBO GAIN button, this setting also enables these controls.
When VTR START/STOP is set to CAM, the VTR button on the remote control unit disables.

When the monitor is connected to the remote control unit

The MONITOR connector (BNC type) of the RM-B150/B750 outputs the same signal as that from the TEST OUT connector on the camcorder.
Use the black cable supplied with the RM-B150/B750 to connect the monitor to the MONITOR connector on the RM-B150/B750.

When the remote control unit is disconnected from the camcorder

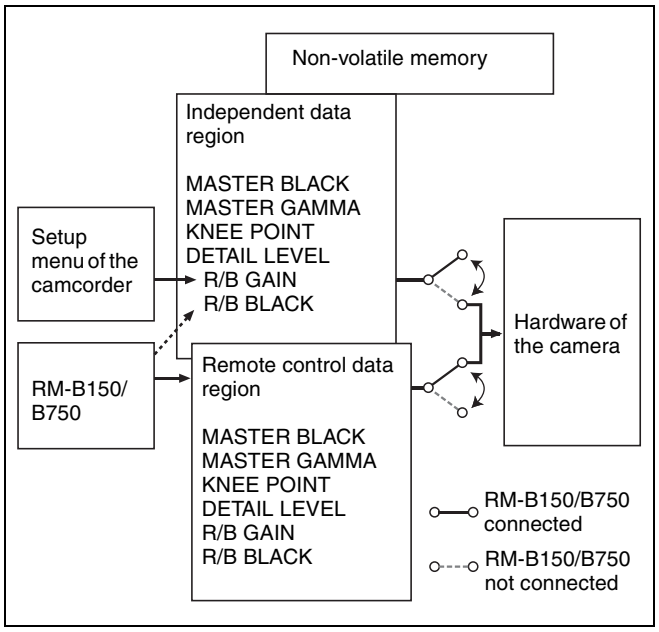
The camcorder settings return to the settings in effect before the remote control unit was connected.
By making a menu setting, the setting of the paint adjustment made with the remote control unit can be retained even after the remote control unit is removed from the camcorder.

For details, see "Structure of the paint adjustment data" below.

Structure of the paint adjustment data

The non-volatile memory of the camcorder used for storing paint adjustment data consists of two regions as shown below: one is the "independent data region" that is used when a remote control unit is not connected, and the other is the "remote control data region" that is used when a remote control unit is connected. Paint adjustment data is automatically selected and output to the hardware of the

camcorder depending on whether or not a remote control unit, such as the RM-B150/B750, is connected.



As a result, when a remote control unit is connected to the camcorder, the effective data region is switched to the "remote control data region" and the settings of the paint adjustment that were in effect last time the remote control unit was used are recalled.
Settings of the absolute value volume [1)] and absolute value switches [2)] are overwritten by those on the remote control unit after the remote control unit is connected.
When the remote control unit is removed from the camcorder, the "independent data region" becomes effective. As a result, the camcorder will return to the settings that were in effect before the remote control unit was connected.

1) Absolute value volume
The data corresponding to the rotation degree (position) of the volume knob is output. The data corresponding to the rotation amount (change) is called the relative value volume.
2) Absolute value switch
Toggle switches or slide switches (except the temporary switches) (or controls) whose positions must coincide with their functions are called absolute value switches.

To use settings of the paint adjustment data stored in the "independent data region" even when you disconnect a remote control unit

Set RM COMMON MEMORY to ON on the FUNCTION 3 page of the MAINTENANCE menu.
In this case, the settings stored in the "independent data region" will be renewed according to the change of settings in the "remote control data region." As a result, the settings of the paint data made with the remote control unit can be retained even if the remote control unit is removed.
However, if the switch position on the remote control unit differs from the one on the camcorder, the switch position on the camcorder takes precedence over that on the remote control unit.

For details on menu operations, see "5-1-2 Basic Menu Operations" on page 76.

To maintain the video quality when a remote control unit is connected

Set RM COMMON MEMORY to ON on the FUNCTION 3 page of the MAINTENANCE menu, and set all the volume values on the remote control unit to the relative volume values. When a remote control unit has an absolute value switch, the settings of the absolute volume switch have a priority over relative value volume settings.

For detailed information on how to set relative volume value settings, refer to the operation manual supplied with the remote control unit.

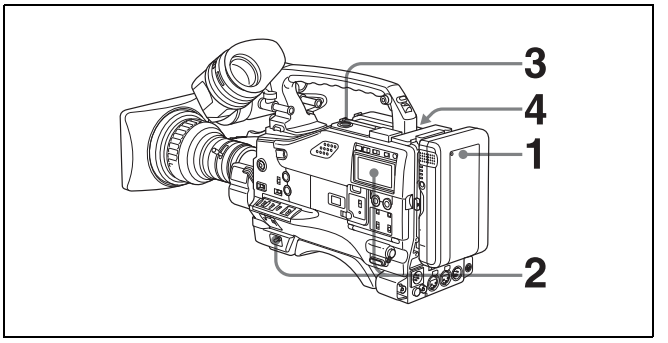
Maintenance

Chapter 8

8-1 Testing the Camcorder Before Shooting

Check the functions of the camcorder before setting out for a shooting session, preferably by operating the camcorder together with a color video monitor.

8-1-1 Preparations for Testing



1 Attach a fully charged battery pack.

2 Set the POWER switch to ON and check that the HUMID indicator does not appear and that the battery power level is sufficient.

If the HUMID indicator appears, wait until it disappears.

3 Check that there are no obstructions near the cassette lid, then push the EJECT button to open the cassette lid.

4 After checking the points below, load the cassette and close the cassette lid.

- The cassette is not write-protected.
- There is no slack in the tape.
- Condensation does not form in the tape.

Condensation

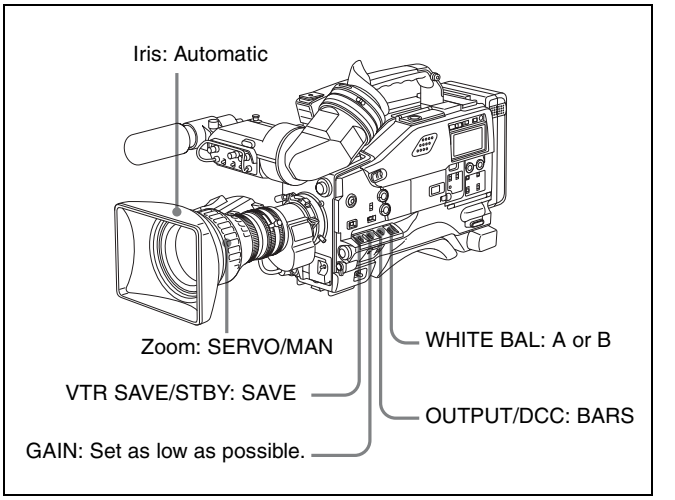
If you move the camcorder from a very cold place to a warm place, or use it in a damp location, condensation may form on the head drum. Then, if the camcorder is operated in this state, the tape may adhere to the drum and cause a failure or even permanent damage. Do the following to prevent this from happening.

- When moving the camcorder from a cold place to a warm place, be sure no cassette is loaded in the camcorder.
- Whenever you turn on the power, check that the HUMID indicator does not appear. If it appears, wait until it disappears before loading a cassette.

For more information, see "3-1-1 Loading and Unloading a Cassette" on page 35 and "8-4 Operation Warnings" on page 139.

8-1-2 Testing the Camera

Set the switches and selectors as follows:



Testing the viewfinder

1 Adjust the position of the viewfinder.

2 Check that the color bars are displayed on the viewfinder screen, and adjust the BRIGHT,

CONTRAST, and PEAKING controls to give the best color bar display.

3 Check each of the following operations.

- The menu is displayed on the viewfinder screen.
- Turn the MENU knob and check that the menu page changes to the next page.
- Push the MENU knob and check that settings of each item of the selected page are displayed.
- Turn the MENU knob and check that the ➧ mark moves within the page.
- Push the MENU knob and check that the ➧ mark placed before the item changes to a ● mark and the ● mark placed before the setting of the item changes to a ? mark.
- Turn the MENU knob and check that the setting of the selected item changes.

4 Set the OUTPUT/DCC switch to CAM, and change the inner FILTER (ND filter) selector position in the sequence of 1, 2, 3 and 4, and the outer FILTER (CC filter) selector position in the sequence B, C, D, A and B.
Check that the FILTER indicator on the viewfinder screen displays the correct numbers.

5 Carry out of the following operations, and check that that the ! indicator lights if the corresponding item has been turned on the '!' LED page of the USER menu.

- Set the gain to anything but 0 dB by using the GAIN selector and the GAIN SW page of the OPERATION menu.
- Set the SHUTTER selector to ON.
- Set the WHITE BAL switch to PRST.
- Set the 5600K mode to ON on the FUNCTION 2 page.
- Use the lens extender.
- Set the inner FILTER (ND filter) selector to anything but 1.
- Set the outer FILTER (CC filter) selector to anything but B.
- Set the reference value of the auto iris adjustment to a value other than the standard value.

Note

When conditions to make the ! indicator light were changed on the '!' LED page, ! indicator lighting operations follow the settings on the '!' LED page.

6 Move the SHUTTER selector from ON to SEL repeatedly, and check that the shutter setting changes on the viewfinder screen.

7 Pointing the camera at a suitable subject, focus the camera and check the picture on the viewfinder screen.

8 Set both of the AUDIO IN switches to FRONT, and check that when sound is input to a microphone connected to the MIC IN connector on the front of the camcorder, the audio level indicators appear on the viewfinder screen.

9 Check that setting the ZEBRA switch to ON and OFF makes the zebra pattern appear and disappear on the viewfinder screen.

Note

The results of checking in steps **3** to **9** may not be as expected, depending on the settings relating to the viewfinder display function. In this case, set the desired items on the VF DISP 1 and VF DISP 2 pages of the USER menu.

For details, see "5-2-2 Selecting Display Items" on page 84.

Testing the iris and zoom functions

1 Set the zoom to automatic zoom mode and check that the power zoom operates correctly.

2 Set the zoom to manual zoom mode and check the zoom functions manually.

3 Set the iris switch on the lens to AUTO and point the camera at objects of different brightness. Check that the automatic iris adjustment operates correctly.

4 Set the iris switch on the lens to MANUAL and check that turning the iris ring manually adjusts the iris correctly.

5 Set the iris switch on the lens back to AUTO and check the following points when the GAIN selector is moved from L to M to H.

- For objects of the same brightness, the iris is adjusted to correspond to the change in setting.
- The gain indicator on the viewfinder screen changes to correspond to the change in setting.

6 If an extender mechanism is incorporated in your lens, set the extender lever of the lens into the 2x position and check the following points.

- The indication "EX" appears at the top left on the viewfinder screen.
- The auto iris functions correctly.

8-1-3 Testing the VTR

Perform tests (1) to (6) consecutively.

(1) Testing the tape transport functions

1 Set the VTR SAVE/STBY switch to VTR SAVE and check that the VTR SAVE indicator in the viewfinder goes on.

2 Set the VTR SAVE/STBY switch to STBY and check that the VTR SAVE indicator in the viewfinder goes off.

3 Set the F-RUN/SET/R-RUN to R-RUN.

4 Set the DISPLAY switch to CTL.

5 Press the VTR START button and check the following points.

- The tape reels are turning.
- The counter indication is changing.
- The REC indicator in the viewfinder is on.
- The RF and SERVO indicators on the display panel are off.

6 Press the VTR START button again and check that the tape stops and that the REC indicator in the viewfinder goes off.

7 Repeat the checks of steps **5** and **6**, this time using the VTR button on the lens.

8 Press the RESET button and check that the indication in the counter display is “00:00:00:00.”

9 Turn on the LCD LIGHT switch and check that the display panel is illuminated.

10 Hold down the REW button to rewind the tape for a while, then push the PLAY button. Check that the rewind and playback functions operate normally.

11 Press the STOP button and press the F FWD button. Check that the fast forward function operates normally.

(2) Testing the automatic audio level adjusting functions

1 Set the AUDIO IN CH-1 and CH-2 switches to FRONT.

2 Set the AUDIO SELECT CH-1/CH-2 switches to AUTO.

3 Set the CH-1/2 / CH-3/4 switch to CH-1/2.

4 Aim the microphone connected to the MIC IN connector at a suitable sound source. Check that the level indications for channels 1 and 2 correspond to the sound level, respectively.

5 Set the AUDIO IN CH-3 and CH-4 switches to F.

6 Set AUDIO SELECT CH3 and AUDIO SELECT CH4 to AUTO on the AUDIO-3 page of the MAINTENANCE menu.

7 Set the CH-1/2 / CH-3/4 switch to CH-3/4.

8 Aim the microphone connected to the MIC IN connector at a suitable sound source. Check that the level indications for both channels 3 and 4 correspond to the sound level.

9 Be sure to reset the CH-1/2 / CH-3/4 switch to CH-1/2 after checking the channels 3 and 4.

(3) Testing the manual audio level adjusting functions

1 Set the AUDIO IN CH-1 and CH-2 switches to FRONT.

2 Set the AUDIO SELECT CH-1 and CH-2 switches to MANUAL.

3 Set the CH-1/2 / CH-3/4 switch to CH-1/2.

4 Turn the MIC LEVEL control. Check that the channel-1 and -2 audio level meter in the display panel increases segments as you turn the control counterclockwise as seen from the front of the camcorder.

5 Set the AUDIO IN CH-3 and CH-4 switches to F.

6 Set AUDIO SELECT CH3 and AUDIO SELECT CH4 to MANU on the AUDIO-3 page of the MAINTENANCE menu.

7 Set the CH-1/2 / CH-3/4 switch to CH-3/4.

8 Check that the channel-3 and -4 audio level meters on the display show respective increases segments as you increase the values of LVL CONROL CH3 and LVL CONTROL CH4 on the AUDIO-3 page of the MAINTENANCE menu.

9 Be sure to reset the CH-1/2 / CH-3/4 switch to CH-1/2 after checking the channels 3 and 4.

(4) Testing the earphone and speaker

1 Turn the MONITOR volume control and check that the speaker volume changes accordingly.

2 Connect an earphone to the front or rear EARPHONE jack.
Check that the speaker sound is cut off and that you can hear the sound from the microphone in the earphone.

3 Turn the MONITOR volume control and check that the earphone volume changes accordingly.

4 Connect the earphone to the other EARPHONE jack. Check the earphone as in step **3**.

(5) Testing external microphones.

1 Set the LINE / AES/EBU / MIC selector that corresponds to the channel to which the external microphone will be connected in step **2** to MIC and set the +48 V/OFF switch as follows.

- If the connected microphone has an internal power supply, set the switch to OFF.
- If the connected microphone has an external power supply, set the switch to +48V.

2 Connect an external microphone to either the AUDIO IN CH1 or AUDIO IN CH2 connector.

3 Set the AUDIO IN switch that corresponds to the channel to which the external microphone is connected to REAR.

4 Aim the microphones at a sound source.

5 Check that the audio level meter in the display panel and the audio level indicators in the viewfinder reflect the changing sound level.

(6) Checking the user bit and time code functions

1 Set the user bits as required.

For the operation, see "4-5-3 Setting the User Bits" on page 72.

2 Set the time code.

For the operation, see "4-5-1 Setting the Time Code" on page 71.

3 Set the F-RUN/SET/R-RUN switch to R-RUN.

4 Press the VTR START button, and check that recording starts and that the counter indication changes.

5 Press the VTR START button again, and check that the tape stops and that the counter indication also stops changing.

6 Set the F-RUN/SET/R-RUN switch to F-RUN, and check that the counter indication changes regardless of whether the tape is running.

7 Set the DISPLAY switch to DATA and the DATA DISPLAY switch to U-BIT, and check that the user bit data that was set is displayed.

8-2 Maintenance

8-2-1 Cleaning the Video Heads

To clean the video heads, use a Sony BCT-HD12CL Cleaning Cassette. Follow the instructions given with the cleaning cassette, as incorrect or excessive use could damage the video heads.
To clean the heads, perform the following:

Load the cleaning cassette according to the procedure described in *"Loading a cassette" (page 35)*.

The tape runs automatically in PLAY mode for about 5 seconds to clean the head.
After the tape runs, the cleaning cassette is automatically ejected.

Note

Do not run the cleaning cassette more than 5 times consecutively.

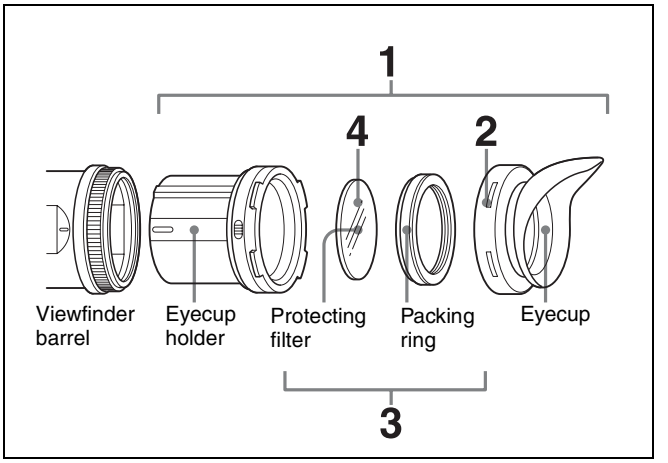
8-2-2 Cleaning the Viewfinder

Use a dust blower to clean the CRT screen and mirror inside the viewfinder barrel.
Clean the lens and protecting filter with a commercially available lens cleaner.

Caution

Never use organic solvents such as thinner.

Disassembling the eyepiece for cleaning



1 Detach the eyepiece from the viewfinder barrel.

For the detaching procedure, see "7-2-4 Detaching the Eyepiece" on page 121.

2 Remove the eyecup from the eyecup holder.

3 Remove the protecting filter, together with the packing ring, from inside the eyecup holder.

4 Detach the protecting filter from the packing ring.

Fog-proof filter

Depending on the temperature and humidity, the protecting filter may mist because of vapor or your breath. To ensure that the viewfinder is always clear, replace the protecting filter with a fog-proof filter (Part No. 1-547-341-11, not supplied).

Fitting the fog-proof filter

Replace the protecting filter on the packing with the fog-proof filter.
Be sure to correctly assemble the fog-proof filter, the packing, and the eyecup so that the reassembled eyepiece is waterproof.

Note

When cleaning the fog-proof filter, wipe it very gently with a soft cloth to avoid damaging the anti-fogging coating.

8-2-3 Cleaning the Tape Transport System

In order to utilize the capability and obtain the best performance of the camcorder and to prolong the life of the camcorder and the cassette tape, cleaning the tape transport system regularly is recommended.

For details on how and when to clean the tape transport system, contact your nearest Sony dealer.

8-2-4 Performing Maintenance After Use Under Severe Condition

After using the camcorder in dusty location, or near beach or hot spring, or when water has got inside the camcorder due to bad weather or similar situations, inspection and cleaning is recommended.

For details on inspection and cleaning, contact your nearest Sony dealer.

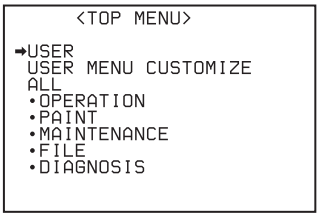
8-3 Periodic Inspection

In order to utilize the capability and obtain the best performance of the camcorder and to prolong the life of the camcorder and the cassette tape, periodic inspection is recommended.

8-3-1 Hours Meter

To display the hours meter on the viewfinder, proceed as follows.
It is recommended to use the hour meter indication as a guide for periodic inspection.

1 Set the MENU ON/OFF switch to ON while pushing the MENU knob.



2 Turn the MENU knob to move the ➡ mark to DIAGNOSIS, then push the MENU knob.

When the DIAGNOSIS menu is used for the first time, the CONTENTS page appears.
Or, if you have used the DIAGNOSIS menu before, the page that was on the screen when the last menu operation ended appears.

3 When the CONTENTS page is displayed, push the MENU knob once, then turn the MENU knob to move the ➡ mark to HOURS METER, and then push the MENU knob.

When any page of the DIAGNOSIS menu is displayed, turn the MENU knob until the HOURS METER page appears.
The following items are indicated.

Indication		Meaning
DRUM RUNNING	XXXXH	Total duration of drum rotation (in units of hour)
TAPE RUNNING	XXXXH	Total duration of tape transport (in units of hour)
OPERATION	XXXXH	Total duration of power-on status (in units of hour)
THREADING	XXXX	Total number of threadings
DRUM RUNNING-2	XXXXH	Duration of drum rotation 1)
TAPE RUNNING-2	XXXXH	Duration of tape transport 1)
OPERATION-2	XXXXH	Duration of power-on status 1)
THREADING-2	XXXX	Number of threadings 1)

1) Resettable

4 To turn off the hours meter, set the MENU ON/OFF switch to OFF.

8-3-2 List of Parts for the Periodic Inspection

The table below indicates the approximate time until each part needs replacement or maintenance. Note that the indicated time does not necessarily mean the guaranteed period of service condition. The time when the part needs replacement or maintenance differs depending on the environment and conditions of use.

No.	Part	Guide for replacement or maintenance	Hours		
			2000	4000	6000
1	Upper drum assembly	A	R	↓	R
2	Slip ring assembly	A	R	↓	R
3	Brush assembly	A	R	↓	R
4	Total drum assembly	A	–	R	–
5	AHC roller assembly	A	R	R	R
6	CR washer	A	R	R	R
7	Timing belt	B	–	R	–
8	S tension regulator band assembly	B	R	R	R

No.	Part	Guide for replacement or maintenance	Hours		
			2000	4000	6000
9	T tension regulator band assembly	B	R	R	R
10	Pinch roller assembly	B	R	R	R
11	Reel drive assemblt	A	O	O	R
12	S tension regulator arm assembly	A	G	G	R
13	S idler assembly (LOW)	A	R	R	R
14	T idler assembly	A	R	R	R

A) "1. DRUM RUNNING" or "5. DRUM RUNNING-2" of the hours meter (duration of drum rotation (in units of hour)).
B) "2. TAPE RUNNING" or "6. TAPE RUNNING-2" of the hours meter (duration of tape transport (in units of hour)).
R) Replacement is required.
↓) Replaced with the part pointed by the arrow (↓).
O) Coat with oil.
G) Coat with grease.

For details on periodic inspection, contact your nearest Sony dealer.

8-4 Operation Warnings

When a problem occurs at power on or during operation, a warning is given by the relevant indicators in the display panel, in the viewfinder and on the camcorder body. The speaker and earphone also give audible warnings.

Operation warnings

Display panel		Indicators in viewfinder			Warning sounds	Problem	VTR operation	Action to take
Warning/ Battery status indication	Status (Flashing/ Lit)	☼ : Lit ☀ : 1 flash/s ☼ : 4 flashes/s			•))) •))) •))) •))) : 4 beeps/s •)))))))))))) : 1 beep/s •)))))))))))))))))))))) : Continuous beep			
		WARNING	REC/tally	BATT				
RF	Lit [1]	☼	☼	–	•))) •))) •))) •))) [1]	Video head gap clogged or problem in recording circuit	After clogged head or failure in power supply system for the drum recorder is detected, recording continues but may be substandard.	Clean the head. If recording is still substandard, turn off the power, and consult your Sony service representative
SERVO	Lit	☼	☼	–	•))) •))) •))) •)))	Servo lock lost	Recording continuous but may be substandard.	Turn off the power and contact your Sony service representative. (This indication may be given momentarily when the tape starts moving, but this does not indicate a problem.)
HUMID!	Lit	☼	☼	–	•))) •))) •))) •))) [1] •)))))))))))))))))))))) [2]	Condensation on the optical pickup.	Recording continues but stops if the tape sticks to the head drum. Playback, fast forward, and rewind do not operate.	Stop the tape, and wait until the HUMID indicator disappears.
SLACK	Lit	☼	☼	–	•))))))))))))))))))))))	Failure in the tape transport mechanism.	VTR stops. An error code appears in the time code display section of the display panel. Look up the error code in the Maintenance Manual.	Remove the cassette by the method described in the Maintenance Manual. Close the cassette lid without loading a cassette, turn off the power, and consult your Sony service representative.
TAPE	Flashing[1]	☀ [1]	☀		•)))))))))))	Near the end of tape	Operation continues.	Be prepared to change the cassette.
TAPE and E	Flashing	☼	☼		•))))))))))))))))))))))	End of tape	Recording stops.	Change the cassette.
BATT	Flashing	☀	☀	☀	•))))))))))) [4]	Battery almost exhausted.	Operation continues. [5]	Change the battery.
BATT and E	Flashing	☼	☼	☼	•))))))))))))))))))))))	Battery exhausted.	Operation stops.	Change the battery.

1) During recording
2) During playback, fast forward, rewinding or stop
3) Additionally "5-0" appears for the tape remaining indication.
4) During recording or in stop mode
5) The VTR once stops recording in auto interval recording mode.

Operation/error messages

An operation or error message is displayed in the operation/error message display area *(see page 83)* in the viewfinder.

Operation/error message	Meaning
AUTO INTERVAL **M**S	Indicates the camera is in the Auto Interval Rec mode. **M**S indicates the shooting interval.
MANU INTERVAL *FRAME	Indicates the camera is in the single shot mode of the Manual Interval Rec mode. *FRAME indicates the number of frames.
INTERVAL **S(M/H)*FRAME	Indicates the camera is in the consecutive mode of the Manual Interval Rec mode. **S(M/H) indicates the trigger interval and *FRAME indicates the number of frames.
LOW LIGHT	Appears, if set to ON on the menu, to indicate the subject illumination is inadequate.
TAPE REC INH.	Appears when recording on a write-protected cassette.
Retake Search Failed	Appears when the camcorder fails to position the tape at recording starting point when recording using the RE-TAKE function.[1)]
Humid Disturbed INT REC	Appears when there are portions where recording has failed due to condensation while shooting pictures at intervals (using the interval rec function).
INVALID OPERATION !	Appears when: • there is only one recorded cut when recording using the RE-TAKE function. • the recorded cuts are less than 3 sec. when recording using the RE-TAKE function. • the RE-TAKE function was denied for some reason, e.g. as Picture Cache was on. • when you execute the RE-TAKE operation before the recording pause operation has completed.
ON-BOARD BATTERY EMPTY	Appears when the backup battery for the internal clock has been used up.[2)]
Power OFF & Manual Eject	Indicates the failure in the tape transport mechanism (the tape is slacked). Turn off the power, and then unload the cassette manually. [3)]
Full Top Sensor Error	Indicates that the trouble of the full top sensor [4)] is detected. Replace the full top sensor [2)].
VTR ERROR! POWER OFF ➡ ON	Indicates that the trouble of the MCU for controlling the VTR section is detected. [2)]
REC Current ARM	Indicates that the trouble of the power supply system for the drum recorder is detected. Recording continues but may not be substandard. [2)]

1) In this case, position the tape at the point where you want to start the recording manually.
2) Contact your nearest Sony dealer.
3) For detailed information on how to unload the cassette manually, see *"Unloading a cassette manually (manual eject)" on page 36*.
4) For detailed information on the full top sensor, refer to the Maintenance Manual.

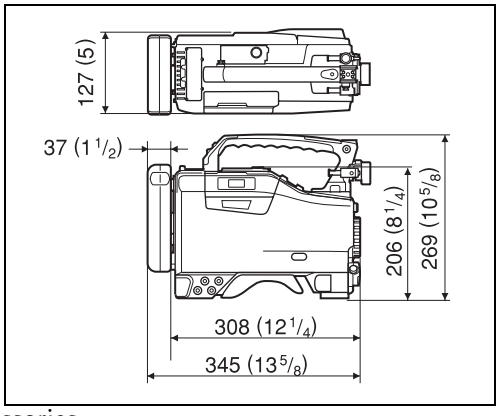
Appendixes

Specifications

General

Power voltage 12 V DC +5.0/–1.0 V
Power consumption
Approx. 34 W (with 12 V DC supply, when recording)
Operating temperature
0°C to +40°C (32°F to 104°F)
Operating humidity
25% to 85% (relative humidity)
Storage temperature
–20°C to +60°C (–4°F to +140°F)
Mass Approx. 5.4 kg (12 lb 2 oz) (with microphone, viewfinder, BCT-40HD cassette and BP-GL95 Battery Pack)

Dimensions in mm (inches)



Supplied accessories
Shoulder strap (1)
XLR connector cover (4)
Stereo microphone (super cardioid directional, external power supply type) (1)
Operation Manual
Japanese version (1)
English version (1)
CD-ROM manual (1)

Video Camera Section

General

Imager $^{2}/_{3}$-inch type CCD with 2,000,000 pixels
Effective picture elements
1920 (H) × 1080 (V)
Imager Configuration
RGB 3 CCDs
Spectral system F1.4 prism system (with quartz filter)
Built-in filters CC filter
A: Cross filter
B: 3200K
C: 4300K
D: 6300K
ND filter
1: Clear
2: $^{1}/_{4}$ ND
3: $^{1}/_{16}$ ND
4: $^{1}/_{64}$ ND
Lens mount Special bayonet mount
Sensitivity F10 standard (89.9% reflection chart, 2000 lx)
Minimum illumination
0.0024 1x (at F1.4, +42 dB gain, 64-frame slow shutter)
Video S/N ratio 54 dB (Y typical)
Registration 0.02% or less for entire screen area (excluding distortion due to lens)
Geometric distortion
None identified (excluding distortion due to lens)
Smear –135 dB (Y-typical)

Stereo microphone

Type Back electret condenser microphone
Directivity Super cardioid
Frequency response
100 Hz to 15 kHz
Output impedance
70 Ω ±20%
Power voltage 48 V DC

VTR Section

General

Usable cassette tapes
BCT-6HD/12HD/22HD/32HD/40HD 1/2-inch Digital HDCAM cassette tapes

Tape speed
96.7 mm/s (for 59.94i format)
80.7 mm/s (for 50i/25PsF format)

Record/playback time
For 59.94i format: 40 minutes (using BCT-40HD)
For 50i/25PsF format: 48 minutes (using BCT-40HD)

Fast forward time
Approx. 5 minutes (using BCT-40HD video cassette)

Rewind time
Approx. 5 minutes (using BCT-40HD video cassette)

Continuous recording time[1)]
Approx. 110 minutes (using BP-GL95 Battery Pack)
Approx. 80 minutes (using BP-GL65 Battery Pack)

1) When using an optional HDVF-20A HD Electronic Viewfinder and operating at the normal temperature of 25°C (77°F)

Digital video

Digital video signal format

Sampling frequency
Y: 74.25 MHz
P_B/P_R: 37.125 MHz

Quantization
10 bits/sample (8 bits/sample for compression processing)

Compression
Coefficient recording system

Channel coding
S-NRZI PR-IV

Error correction
Reed-Solomon code

Error concealment
Adaptive three dimensional

Audio (with standard playback machine)

Frequency response
20 Hz to 20 kHz +0.5/–0.8 dB

Dynamic range
85 dB min. (emphasis ON)

Distortion (THD)
0.08% max.

Cross talk
–70 dB max.

Wow and flutter
Below measurable limit

Input/output connectors

Signal inputs

AUDIO IN CH1/CH2
XLR type, 3-pin, female
–60 dBu/–50 dBu/–40 dBu/+4 dBu/AES/EBU (0 dBu = 0.775 Vrms.)

MIC IN
XLR type, 5-pin, female –60 dBu/–50 dBu/–40 dBu
(LPF ON)

GENLOCK IN
BNC type
1.0 Vp-p, 75 Ω, unbalanced

TC IN
BNC type
0.5 V to 18 Vp-p, 10 k Ω

Signal outputs

TEST OUT
BNC type
1.0 Vp-p, 75 Ω, unbalanced

HD-SDI OUT
BNC type, 0.8 Vp-p, 75 Ω, unbalanced

AUDIO OUT
XLR type, 5-pin, male, 0 dBm

TC OUT
BNC type, 1.0 Vp-p, 75 Ω

EARPHONE
minijack
8 Ω, –∞ to –18 dBs variable

Others

DC IN
XLR type, 4-pin, male, 11 to 17 V DC

DC OUT
4-pin, female, 11 to 17 V DC, maximum rated current 0.1 A

LENS
12-pin, 11 to 17 V DC, maximum rated current 0.3 A

REMOTE
8-pin

Recommended Additional Equipment

Viewfinder

HDVF-20A HD Electronic Viewfinder
HDVF-C30W HD Electronic Viewfinder

Power supply and related equipment

BP-GL65/GL95/L60S Battery Pack
BC-L70/M150 Battery Charger
AC-DN10 AC Adaptor

HDCAM cassette tapes

BCT-6HD/12HD/22HD/32HD/40HD

Memory label

MLB-IM-100

Viewfinder and related equipment

BKW-401 Viewfinder Rotation Bracket
Fog-proof filter (Part No. 1-547-341-11)
Lens assembly (farsighted) (Part No. A-8262-537-A)

Lens assembly (low magnification) (Part No. A-8262-538-A)
Lens assembly (standard magnification with special compensation for aberrations) (Part No. A-8267-737-A)

Optical attachments

ND filter ($^1/_8$ ND) (Part No. 3-174-685-01)
ND filter ($^1/_{32}$ ND) (Part No. 3-174-683-01)

Consult your Sony representative for more information about these filters.

Equipment for remote control

RM-B150/B750 Remote Control Unit

"Memory Stick"

MSH-128 (128 MB)

Audio equipment

ECM-674/678 Microphone
CAC-12 Microphone Holder
CCXA-53 Audio Cable (for converting 5-pin connector to two 3-pin connectors)
WRR-855A/855B UHF Synthesized Tuner Unit
WRR-861A/861B/862A/862B UHF Portable Tuner
WRT-8B UHF Transmitter
WRR Tuner Fitting (service part number: A-8278-057-A)

For Audio equipment described above, confirm whether the connector is male or female and the number of pins on the connector.

The audio input connectors of the camcorder are female and 3-pin and 5-pin and the audio output connectors are male and 5-pin. A converting adaptor may be required depending on the audio equipment to be connected to the camcorder.

Extension boards

HKDW-702 Down Converter Board
HKDW-703 Picture Cache Board
HKDW-905R Slow Shutter and Image Inverter Board

Equipment for maintenance and easier handling

BCT-HD12CL Cleaning Cassette
LC-DN7 Hard Carrying Case
LC-DS300SFT Soft Carrying Case
Tripod Adaptor VCT-14
Rain cover (Part No. 3-191-064-02)
Maintenance Manual

Design and specifications are subject to change without notice.

Notes

- Always make a test recording, and verify that it was recorded successfully.
  SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF FAILURE OF THIS UNIT OR ITS RECORDING MEDIA, EXTERNAL STORAGE SYSTEMS OR ANY OTHER MEDIA OR STORAGE SYSTEMS TO RECORD CONTENT OF ANY TYPE.
- Always verify that the unit is operating properly before use. SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION OR REIMBURSEMENT ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS DUE TO FAILURE OF THIS UNIT, EITHER DURING THE WARRANTY PERIOD OR AFTER EXPIRATION OF THE WARRANTY, OR FOR ANY OTHER REASON WHATSOEVER.

Menu List

In this section, tables are used to briefly explain menus that the camcorder provides for adjustments and settings.

For menu organization and the USER menu, see Chapter 5.

Note

The page number displayed on the top line of the menu may be different if an optional extension board is installed.

OPERATION Menu

The following table lists and describes the items in the OPERATION menu. Some pages of the OPERATION menu have been registered in the USER menu at the factory. These pages are indicated by a circle (○) in the USER menu column. The USER MENU CUSTOMIZE menu allows you to add and delete pages in the USER menu to suit your requirements.

When the setting range in the Settings column is surrounded by parentheses ( ), the setup value is a relative value. The setting range shown on the menu screen may differ from what is shown in the manual.

USER menu	No.	Page	Item	Settings	Default	Description
○	01	OUTPUT SEL	HD SDI OUT	OFF/ON	ON	*See "5-3-2 Selecting Output Signals" on page 94.*
			SD REAR BNC OUT[1)]	OFF/VBS/SDI	VBS	
			TEST OUT SELECT	HD/SD	HD	
			DOWN CON MODE[1)]	CROP/SQEZE/ LETTR	CROP	

USER menu	No.	Page	Item	Settings	Default	Description
○	02	FUNCTION 1	ASSIGN SW <1>	OFF / F. MIC MONO/ STEREO / PICTURE CACHE ON/OFF / TEST OUT CHARACTER / MARKER / RE-TAKE / ATW / RETURN VIDEO / LENS RET / REC SWITCH / TURBO SWITCH / TELE-FILE MARK / ZEBRA / 5600K / FREEZE MANUAL TRIG	5600K	*See "5-3-5 Assigning Functions to Assignable Switches" on page 96.*
			ASSIGN SW <2>	OFF / F. MIC MONO/ STEREO / PICTURE CACHE ON/OFF / TEST OUT CHARACTER / MARKER / ZEBRA / CAM/FREEZE SELECT	F. MIC	
			TURBO SW	OFF / F. MIC MONO/ STEREO / PICTURE CACHE ON/OFF / TEST OUT CHARACTER / MARKER / RE-TAKE / ATW / RETURN VIDEO / LENS RET / REC SWITCH / TURBO SWITCH / TELE-FILE MARK / ZEBRA / FREEZE MANUAL TRIG	TURBO	
			FRONT MIC SELECT	MONO/STREO	STREO	Selects stereo or monaural when a stereo microphone is connected to the front MC IN connector.
			DF/NDF[2)]	DF/NDF	DF	Switches between drop frame (DF) mode and non-drop frame (NDF) mode.
			END SEARCH	OFF/ON	OFF	Turns the END SEARCH function on/off.
			CACHE/INTVAL REC	OFF/CACHE/A.INT/ M.INT	OFF	*See "3-2-5 Starting a Shoot with a Few Seconds of Pre-Stored Picture Data (Picture Cache Function: with the HKDW-703)" on page 41.*
			(CACHE) CACHE REC TIME	0/1/2/3/4/5/6/7[3)]SEC	0 SEC	

USER menu	No.	Page	Item	Settings	Default	Description
			(A.INT) TAKE TOTAL TIME	5/10/15/20/30/40/50 MIN, 1/2/3/4/5/7/10/15/20/30/40/50/70/100 H	5 MIN	*See "3-2-6 Shooting Picture at Intervals (Interval Rec Function: with the HKDW-703)" on page 43.*
			(A.INT) REC TIME	5/10/15/20/30/40/50 SEC, 1 to 40[4)] MIN	5 SEC	
			(A.INT and M.INT except TRIGGER INTERVAL set to M) PRE-LIGHTING	OFF/2SEC/5SEC/10SEC	OFF	
			(M.INT) NUMBER OF FRAME	1/2/4/8	1	
			(M.INT) TRIGGER INTERVAL	M, 1 to 10/15/20/30/40/50 SEC, 1 to 10/15/20/30/40/50 MIN, 1/2/3/4/6/12/24 H	M	
	03	FUNCTION 2	5600K	OFF/ON	OFF	Turns the function which electrically applies a 5600K color temperature filter on and off.
			WHITE SWITCH <B>	MEM/ATW	MEM	Sets the function of the WHITE BAL B switch.
			SHOCKLESS WHITE	OFF/1/2/3	1	Changes the white gain smoothly when operating the WHITE BAL switch.
			ATW SPEED	1 to 5	4	Changes the speed of the Auto Tracing White operation.
			LOW LIGHT	OFF/ON	OFF	Turns the warning display on/off when the video average level is less than the preset value.
			LOW LIGHT LEVEL	(–99 to 99)	0	Sets the level at which the LOW LIGHT function becomes effective.
			VF BATT WARNING	10/20%	10%	Sets the threshold value of remaining battery capacity to make the remaining capacity indication flash.
			PB VIDEO	ALL/HDSDI	ALL	Selects the output destination of the recorded video signals. See *"3-3-3 Checking the Camera Picture on the Viewfinder and/or Color Video Monitor" on page 52*.
			ABS (VF MENU)	OFF/ON	OFF	Indicates the items indicated as relative values as absolute values. (Values of object items are highlighted.)

USER menu	No.	Page	Item	Settings	Default	Description
	04	FREEZE MIX[5)]	FREEZE	OFF/ON	OFF	*See "5-3-10 Using the Freeze Mix Function" on page 103.*
			FREEZE AUTO TRIG	OFF/REC.S/REC.P	OFF	
			FREEZE MAN TRIG	EXEC	EXEC	
			FREEZE STOP TIME	0S/0.5S/1.0S/1.5S/ 2.0S	1.0S	
			CAM/FREEZE SEL	FREZE/CAM	FREZE	
			FREEZE/MIX SEL	FREZE/MIX	FREZE	
			FREEZE STATUS	CLEAR/STORE	CLEAR	
○	05	VF DISP 1	VF DISP	OFF/ON	OFF	*See "5-2-2 Selecting Display Items" on page 84.*
			VF DISPLAY MODE	1/2/3	3	
			DISP EXTENDER	OFF/ON	ON	
			DISP FILTER	OFF/ON	ON	
			DISP WHITE	OFF/ON	ON	
			DISP 5600K	OFF/ON	ON	
			DISP GAIN	OFF/ON	ON	
			DISP SHUTTER	OFF/ON	ON	
			DISP AUDIO	OFF/ON	ON	
			DISP TAPE	OFF/ON	ON	
○	06	VF DISP 2	DISP IRIS	OFF/ON	ON	*See "5-2-2 Selecting Display Items" on page 84.*
			DISP ZOOM	OFF/ON	ON	
			DISP COLOR TEMP.	OFF/ON	OFF	
			DISP BATT REMAIN	INT/VOLT/AUTO	INT	
			DISP DC IN	OFF/ON	OFF	
			DISP WRR RF LVL	OFF/ON	OFF	
			DISP FREEZE	OFF/ON	OFF	*See "5-3-10 Using the Freeze Mix Function" on page 103.*
			DISP TIME CODE	OFF/ON	OFF	*See "5-2-2 Selecting Display Items" on page 84*
○	07	'!' LED	GAIN <!>	OFF/ON	ON	*See "5-2-4 Selecting the Items for Which the '!' LED is to Light" on page 86.*
			SHUTTER <!>	OFF/ON	ON	
			WHITE BAL <!>	OFF/ON	ON	
			5600K <!>	OFF/ON	ON	
			ATW <!>	OFF/ON	ON	
			EXTENDER <!>	OFF/ON	ON	
			FILTER <!>	OFF/ON	OFF	
			OVERRIDE <!>	OFF/ON	ON	

USER menu	No.	Page	Item	Settings	Default	Description
	08	'!' LED STD	GAIN <!>	0dB/LOW/MID/HIGH	0dB	*See "5-2-4 Selecting the Items for Which the '!' LED is to Light" on page 86.*
			SHUTTER <!>	OFF/ECS/SLS/ 1/60[6)]	OFF[7)]	
			WHITE BAL <!>	P/A/B/PA/PB/AB	AB	
			5600K <!>	OFF/ON	OFF	
			ATW <!>	OFF/ON	OFF	
			EXTENDER <!>	OFF/ON	OFF	
			FILTER ND <!>	1/2/3/4	1	
			FILTER CC <!>	A/B/C/D	B	
			OVERRIDE <!>	OFF/ON	OFF	
○	09	MARKER 1	MARKER	OFF/ON	OFF	*See "5-2-5 Setting Marker Display" on page 87.*
			CENTER	OFF/ON	OFF	
			CENTER MARK	1/2/3/4	3	
			SAFETY ZONE	OFF/ON	OFF	
			SAFETY AREA	80%/90%/92.5%/ 95%	90%	
			ASPECT	OFF/ON	OFF	
			ASPECT SELECT	15:9/14:9/13:9/4:3/ 1.85/2.35	4:3	
			ASPECT MASK	OFF/ON	OFF	
			ASPECT MASK LVL	0 to 8	0	
			100% MARKER	OFF/ON/SD[1)]	OFF	
	10	MARKER 2	USER BOX	OFF/ON	OFF	Turns the box cursor on/off.
			USER BOX WIDTH	1 to 479	240	Adjusts the width (from the center to right or left side) of the box cursor.
			USER BOX HEIGHT	1 to 269	135	Adjusts the height (from the center to top or bottom) of the box cursor.
			USER BOX H POS.	–480 to 479	0	Adjusts the H position of the center.
			USER BOX V POS.	–270 to 269	0	Adjusts the V position of the center.
			CENTER H POS.	–479 to 479	0	Adjusts the H position of the center marker.
			CENTER V POS.	–268 to 268	0	Adjusts the V position of the center marker.
			ASPECT SAFE ZONE	OFF/ON	OFF	Turns the SAFETY ZONE display on or off for the aspect mode selected in the ASPECT SELECT item on the MARKER 1 page.
			ASPECT SAFE AREA	80%/90%/92.5%/ 95%	90%	Selects the range of the aspect safety zone.
○	11	GAIN SW	GAIN LOW	–3dB/0dB/3dB/6dB/ 9dB/12dB/18dB/ 24dB/30dB/36dB/ 42dB	0dB	*See "5-3-1 Setting Gain Values for the GAIN Selector Positions" on page 93.*
			GAIN MID		6dB	
			GAIN HIGH		12dB	
			GAIN TURBO		42dB	
			TURBO SW IND	OFF/ON	OFF	

USER menu	No.	Page	Item	Settings	Default	Description
○	12	VF SETTING	ZEBRA	OFF/ON	OFF	*See "5-2-6 Setting the Viewfinder" on page 88.*
			ZEBRA SELECT	1/2/BOTH	1	
			ZEBRA1 DET.LVL	50% to 105% (1% steps)	70%	
			ZEBRA2 DET.LVL	95% to 105% (1% steps)	100%	
			ASPECT	OFF/ON	OFF	
			VF DETAIL LEVEL	(–99 to 99)	0	
			VF DTL H LEVEL	(–99 to 99)	0	
			VF DTL V LEVEL	(–99 to 99)	0	
○	13	AUTO IRIS	IRIS OVERRIDE	OFF/ON	OFF	*See "4-3 Changing the Reference Value for Automatic Iris Adjustment" on page 66.*
			IRIS SPEED	0/1/2/3/4/5	3	
			CLIP HIGH LIGHT	OFF/ON	OFF	
			IRIS WINDOW	1/2/3/4/5/6/VAR	1	
			IRIS WINDOW IND	OFF/ON	OFF	
			IRIS VAR WIDTH	20 to 479	240	
			IRIS VAR HEIGHT	20 to 269	135	
			IRIS VAR H POS.	–460 to 460	0	
			IRIS VAR V POS.	–249 to 249	0	
○	14	SHOT ID	ID-1	12 characters	—	*See "5-2-8 Setting the Shot ID" on page 89.*
			ID-2			
			ID-3			
			ID-4			
○	15	SHOT DISP	SHOT DATE	OFF/ON	OFF	*See "5-2-7 Recording Shot Data Superimposed on the Color Bars" on page 88.*
			SHOT TIME	OFF/ON	OFF	
			SHOT MODEL NAME	OFF/ON	OFF	
			SHOT SERIAL NO	OFF/ON	OFF	
			SHOT ID SEL	OFF/ID-1/ID-2/ID-3/ ID-4	OFF	
			SHOT BLINK CHARA	OFF/ON	OFF	
○	16	SET STATUS	STATUS ABNORMAL	OFF/ON	ON	*See "5-2-9 Displaying the Status Confirmation Windows" on page 91.*
			STATUS FUNCTION	OFF/ON	ON	
			STATUS AUDIO	OFF/ON	ON	

USER menu	No.	Page	Item	Settings	Default	Description
	17	TEST OUT	TEST OUT MARKER	OFF/ON	OFF	Selects whether or not the marker signal is mixed with the output signal from the TEST OUT connector.
			TEST OUT VFDISP	OFF/ON	OFF	Selects whether or not the VF DISP display signal is mixed with the output signal from the TEST OUT connector.
			TEST OUT MENU	OFF/ON	OFF	Selects whether or not the MENU display signal is mixed with the output signal from the TEST OUT connector.
			TEST OUT ZEBRA	OFF/ON	OFF	Selects whether or not the ZEBRA display signal is mixed with the output signal from the TEST OUT connector.
			OUTPUT SELECT[8)]	Y/R/G/B	Y	Select the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[1)].
	18	OFFSET WHT	OFFSET WHITE <A>	OFF/ON	OFF	*See "5-3-4 Specifying an Offset for the Auto White Balance Setting" on page 95.*
			WARM-COOL <A>	Display color temperature	3200	
			WARM-COOL BAL <A>	(–99 to 99)	0	
			OFFSET WHITE <B>	OFF/ON	OFF	
			WARM-COOL <B>	Display color temperature	3200	
			WARM-COOL BAL <B>	(–99 to 99)	0	
	19	SHT ENABLE	SHUTTER ECS	OFF/ON	ON	*See "4-2 Setting the Electronic Shutter" on page 62.*
			SHUTTER 1/60	OFF/ON	ON	
			SHUTTER 1/100	OFF/ON	ON	
			SHUTTER 1/125	OFF/ON	ON	
			SHUTTER 1/250	OFF/ON	ON	
			SHUTTER 1/500	OFF/ON	ON	
			SHUTTER 1/1000	OFF/ON	ON	
			SHUTTER 1/2000	OFF/ON	ON	
○	20	LENS FILE	LENS FILE SELECT	1 to 32	1	*See "5-3-7 Selecting a Lens File" on page 99.*
			F. ID	(Display only)	—	
			L. ID	(Display only)	—	To show the lens-specific ID (when a serial lens is connected).
			L. MF	(Display only)	—	To show the name of the lens manufacturer (when a serial lens is connected).

USER menu	No.	Page	Item	Settings	Default	Description
	21	UMID SET	EX-OWNERSHIP REC	OFF/ON	OFF	*See "5-3-8 Using AMID Data" on page 100.*
			COUNTRY CODE	4 alphanumeric characters	—	
			ORGANIZATION	4 alphanumeric characters	—	
			USER CODE	4 alphanumeric characters	—	
			INSTANCE NO	RND/GEN	RND	
			TIME ZONE	00 to 25, 1A to 1F, 2A to 2F, 32, 3A to 3F	00	
			MACHINE	*n*	—	

1) This item is displayed when an optional HKDW-702 is installed.
2) When either 50i or 25PsF is selected, this item is not displayed.
3) When 59.94i is selected, the maximum setting is 7SEC.
When either 50i or 25PsF is selected, the maximum setting is 8SEC.
4) When 59.94i is selected, the maximum setting is 40 MIN.
When either 50i or 25PsF is selected, the maximum setting is 48 MIN.
5) This item is displayed when an optional HKDW-905 is installed.
6) The shutter speed depends on the selected frame frequency. See *"4-2-1 Shutter Modes" on page 62*.
7) When either 50i or 59.94i is selected, OFF is the default setting.
When 25PsF is selected, 1/50 is the default setting.
8) When Y is selected in the camcorder with an optional HKDW-702, the color signal is output from the connector whose selected output signal is an SD signal.

PAINT Menu

The following table lists and describes the items in the PAINT menu.
When the setting range in the Settings column is surrounded by parentheses ( ), the setup value is a relative value. The setting range shown on the menu screen may differ from what is shown in the manual.

No.	Page	Item	Settings	Default	Description
P01	SW STATUS	GAMMA	OFF/ON	ON	Turns the gamma correction on/off.
		BLACK GAMMA	OFF/ON	OFF	Turns the black gamma correction on/off.
		MATRIX	OFF/ON	OFF	Turns the linear matrix correction on/off.
		KNEE	OFF/ON	ON	Turns the knee correction on/off.
		WHITE CLIP	OFF/ON	ON	Turns the white clipping correction on/off.
		DETAIL	OFF/ON	ON	Turns the detail signal on/off.
		APERTURE	OFF/ON	ON	Turns the aperture function on/off.
		FLARE	ON/OFF	ON	Turns the flare function on/off.
		EVS	OFF/ON	OFF	Turns the EVS shutter on/off.
		TEST SAW	OFF/ANALG/ DIGIT	OFF	Selects the test signal.

No.	Page	Item	Settings	Default	Description
P02	WHITE	COLOR TEMP <A>	Display color temperature	3200	Sets the color temperature of WHITE A. (Displayed one is a rough guide only)
		C TEMP BAL <A>	(–99 to 99)	0	Adjusts the value more precisely when the color temperature adjustment through COLOR TEMP is not satisfactory.
		R GAIN <A>	(–99 to 99)	0	Only the value of R GAIN is changed.
		B GAIN <A>	(–99 to 99)	0	Only the value of B GAIN is changed.
		5600K <A>	OFF/ON	OFF	Turns the WHITE A electronic 5600K filter on/off.
		COLOR TEMP <B>	Display color temperature	3200	Sets the color temperature of WHITE B. (Displayed one is a rough guide only)
		C TEMP BAL <B>	(–99 to 99)	0	Adjusts the value more precisely when the color temperature adjustment through COLOR TEMP is not satisfactory.
		R GAIN <B>	(–99 to 99)	0	Only the value of R GAIN is changed.
		B GAIN <B>	(–99 to 99)	0	Only the value of B GAIN is changed.
		5600K <B>	OFF/ON	OFF	Turns the WHITE B electronic 5600K filter on/off.
P03	BLACK/FLARE	MASTER BLACK	(–99 to 99)	0	Adjusts the master black level.
		R BLACK	(–99 to 99)	0	Adjusts the R black level.
		G BLACK	(–99 to 99)	0	Adjusts the G black level.
		B BLACK	(–99 to 99)	0	Adjusts the B black level.
		MASTER FLARE	(–99 to 99)	0	Adjusts the flare level of the master.
		R FLARE	(–99 to 99)	0	Adjusts the R flare level.
		G FLARE	(–99 to 99)	0	Adjusts the G flare level.
		B FLARE	(–99 to 99)	0	Adjusts the B flare level.
		FLARE	OFF/ON	ON	Turns the flare correction circuit on/off.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
P04	GAMMA	GAMMA	OFF/ON	ON	Turns the gamma correction function on/off.
		STEP GAMMA	0.35 to 0.90	0.45	Sets the master gamma correction curve in steps.
		MASTER GAMMA	(–99 to 99)	0	Sets the master gamma correction curve.
		R GAMMA	(–99 to 99)	0	Sets the R gamma correction curve.
		G GAMMA	(–99 to 99)	0	Sets the G gamma correction curve.
		B GAMMA	(–99 to 99)	0	Sets the B gamma correction curve.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
		GAMMA SELECT	STD/HG	STD	Selects the gamma table.
		GAM SEL (STD)	1 to 4	3	Selects the gamma table of STD.
		GAM SEL (HG)	1 to 4	4	Selects the hyper gamma table of hyper gamma.

No.	Page	Item	Settings	Default	Description
P05	BLACK GAMMA	BLACK GAMMA	OFF/ON	OFF	Turns the black gamma correction on/off.
		BLACK GAM RANGE	LOW/L.MID/ H.MID/HIGH	HIGH	Sets the range affected by black gamma.
		MASTER BLK GAMMA	(–99 to 99)	0	Adjusts the master black gamma.
		R BLACK GAMMA	(–99 to 99)	0	Sets the correction curve of the R black gamma.
		G BLACK GAMMA	(–99 to 99)	0	Sets the correction curve of the G black gamma.
		B BLACK GAMMA	(–99 to 99)	0	Sets the correction curve of the B black gamma.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
P06	KNEE 1	KNEE	OFF/ON	ON	Turns the knee correction circuit on/off.
		KNEE POINT (M)	50.0 to 109.0	95.0	Sets the master knee point level.
		KNEE SLOPE (M)	(–99 to 99)	0	Set the master knee slope level.
		KNEE SATURATION	OFF/ON	ON	Turns the knee saturation function on/off.
		KNEE SAT LEVEL	(–99 to 99)	0	Sets the knee saturation level.
		WHITE CLIP	OFF/ON	ON	Turns the white clipping function on/off.
		WHITE CLIP LEVEL	100.0 to 109.5	109.0[3)]	Adjusts the white clipping level.
P07	KNEE 2	KNEE SATURATION	OFF/ON	OFF	Turns the knee saturation function on/off.
		KNEE POINT (R)	–45.0 to 14.0	0.0	Sets the R knee point level.
		KNEE SLOPE (R)	(–99 to 99)	0	Sets the R knee slope level.
		KNEE POINT (G)	–45.0 to 14.0	00	Sets the G knee point level.
		KNEE SLOPE (G)	(–99 to 99)	0	Sets the G knee slope level.
		KNEE POINT (B)	–45.0 to 14.0	0.0	Sets the B knee point level.
		KNEE SLOPE (B)	(–99 to 99)	0	Sets the B knee slope level.
P08	DETAIL 1	DETAIL	OFF/ON	ON	Sets the detail correction function on/off.
		APERTURE	OFF/ON	ON	Turns the aperture correction function on/off.
		DETAIL LEVEL	(–99 to 99)	0	Sets the general level of the detail signal.
		APERTURE LEVEL	(–1 to 14)	0	Sets the aperture level.
		DTL H/V RATIO	(–99 to 99)	0	Sets the level of the V detail signal.
		CRISPENING	(–99 to 99)	0	Sets the crispening level.
		LEVEL DEPEND	OFF/ON	ON	Turns the level depend function on/off.
		LEVEL DEPEND LVL	(–99 to 99)	0	Sets the level of the level depend function.
		DETAIL FREQ	(–99 to 99)	0	Sets the frequency of the H detail signal.
P09	DETAIL 2	KNEE APERTURE	OFF/ON	OFF	Turns the knee aperture function on/off.
		KNEE APT LEVEL	(–99 to 99)	0	Sets the knee aperture level.
		DTL WHT LIMIT	(–99 to 99)	0	Sets the detail white limiter.
		DTL BLK LIMIT	(–99 to 99)	0	Sets the detail black limiter.
		DTL V-BLK LMT	(–99 to 99)	0	Sets the V detail black limiter.
		H/V CONTROL MODE	H/V / V	V	Select the operation mode of DETAIL H/V RATIO on the DETAIL 1 page. (H/V: H and V both enabled, V: V DTL only enabled)

No.	Page	Item	Settings	Default	Description
P10	SD DETAIL[4)]	SD DETAIL	OFF/ON	ON	Turns the detail function on or off.
		SD DETAIL LEVEL	(–99 to 99)	0	Sets the general level of the detail signal.
		SD CRISPENING	(0 to 15)	0	Sets the crispening level.
		SD DTL WHT LIMIT	(–99 to 99)	0	Sets the detail white limiter.
		SD DTL BLK LIMIT	(–99 to 99)	0	Sets the detail black limiter.
		SD LEVEL DEPEND	OFF/ON	ON	Turns the level depend function on or off.
		SD LV DEPEND LVL	(–8 to 3)	0	Sets the level depend level.
		SD DTL FREQ.	(–2 to 1)	0	Sets the frequency of the H detail signal.
		SD DTL H/V RATIO	(–3 to 4)	0	Sets the V detail.
		SD CROSS COLOR[5)]	(–8 to 7)	0	Sets the cross color suppression level.
P11	SKIN DETAIL	SKIN DETAIL ALL	OFF/ON	OFF	Turns on all of 1, 2, and 3 of the color detail function.
		SKIN DETECT	Moves to color detection page.	EXEC	Executes the color detail function.
		SKIN AREA IND	OFF/ON	OFF	Turns the zebra indication on/off in the area of the currently selected type of the color detail function.
		SKIN DTL SELECT	1/2/3	1	Selects the channels to be displayed on the menu.
		SKIN DETAIL	OFF/ON	ON	Turns the color detail function on/off for the selected channels.
		SKIN DETAIL LVL	(–99 to 99)	0	Sets the level of the color detail signal.
		SKIN DTL SAT	(–99 to 99)	0	Adjusts the saturation level of the hue possessed by the color detail function.
		SKIN DTL HUE	(0 to 359)	0	Adjusts the center phase of the hue possessed by the color detail function.
		SKIN DTL WIDTH	(0 to 359)	40	Adjusts the width of the hue possessed by the color detail function.
P12	MTX LINEAR	MATRIX	OFF/ON	OFF	Turns the linear matrix correction and user-set matrix correction functions on/off.
		MATRIX (USER)	OFF/ON	OFF	Turns the user-set matrix correction function on/off.
		MATRIX (PRESET)	OFF/ON	ON	Turns the preset matrix correction function on/off.
		MATRIX (PRESET) SEL	1/2/3/4/5/6	2	Selects the preset matrix. 1: SMPTE 240M or equivalent 2: ITU-709 or equivalent 3: SMPTE WIDE or equivalent 4: NTSC or equivalent 5: EBU or equivalent 6: ITU-601 or equivalent
		MATRIX R-G	(–99 to 99)	0	Sets the arbitrary R-G user-set matrix coefficients.
		MATRIX R-B	(–99 to 99)	0	Sets the arbitrary R-B user-set matrix coefficients.
		MATRIX G-R	(–99 to 99)	0	Sets the arbitrary G-R user-set matrix coefficients.
		MATRIX G-B	(–99 to 99)	0	Sets the arbitrary G-B user-set matrix coefficients.
		MATRIX B-R	(–99 to 99)	0	Sets the arbitrary B-R user-set matrix coefficients.
		MATRIX B-G	(–99 to 99)	0	Sets the arbitrary B-G user-set matrix coefficients.

No.	Page	Item	Settings	Default	Description
P13	MTX MULTI	MATRIX	OFF/ON	OFF	Turns the linear matrix correction and multi matrix correction functions on/off.
		MATRIX (MULTI)	OFF/ON	OFF	Turns the multi matrix correction function on/off.
		MATRIX AREA IND	OFF/ON	OFF	Turns the zebra indication on/off in the area corresponding to the currently selected setting.
		MATRIX COLOR DET	—	EXEC	Sets MTX (MULTI) AXIS to the axis corresponding to the detected color.
		MULTI MTX PRESET	—	EXEC	Presets settings for 16 axes of MTX (MULTI) HUE and MTX (MULTI) SAT respectively.
		MTX (MULTI) AXIS	B/B+/MG–/MG/MG+/R/R+/YL–/YL/YL+/G–/G/G+/CY/CY+/B–	B	Selects the axis for which the multi matrix correction function can be changed.
		MTX (MULTI) HUE	(–99 to 99)	0	Adjusts the color phase affected by the multi matrix correction function in every sixteen-axis mode.
		MTX (MULTI) SAT	(–99 to 99)	0	Adjusts the saturation level affected by the multi matrix correction function in every sixteen-axis mode.
P14	V MODULATION	V MOD	OFF/ON	ON	Turns the V modulation function on/off.
		MASTER VMOD	(–99 to 99)	0	Turns the master V modulation function on/off.
		R VMOD	(–99 to 99)	0	Turns the R V modulation function on/off.
		G VMOD	(–99 to 99)	0	Turns the G V modulation function on/off.
		B VMOD	(–99 to 99)	0	Turns the B V modulation function on/off.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
P15	SATURATION	SATURATION	OFF/ON	OFF	Turns saturation adjustment function on/off.
		SAT. LEVEL	(–99 to 99)	0	Sets the saturation level.
		LOW KEY SAT	OFF/ON	OFF	Turns the low key saturation function on/off.
		L.KEY SAT LEVEL	(–99 to 99)	0	Sets the saturation level of the low luminance part.
		L.KEY SAT RANGE	LOW/L.MID/H.MID/HIGH	HIGH	Sets the luminance level at which the low key saturation function becomes effective.
		Y BLACK GAMMA	OFF/ON	OFF	Turns the Y black gamma function on/off.
		Y BLK GAM LEVEL	(–99 to 99)	0	Sets the gamma curve in the low luminance part.
		Y BLK GAM RANGE	LOW/L.MID/H.MID/HIGH	HIGH	Sets the luminance level at which the Y black gamma becomes effective.

No.	Page	Item	Settings	Default	Description
P16	SCENE FILE	1	—	—	Recalls the scene file saved in the memory of the camcorder.
		2	—	—	
		3	—	—	
		4	—	—	
		5	—	—	
		STANDARD	—	—	Clears all current detail-adjusted settings and switch settings and returns the settings to the standard settings saved in the reference file.
		SCENE RECALL	—	—	Recalls the scene file from the memory of the camcorder or the “Memory Stick.”
		SCENE STORE	—	—	Stores the scene file in the memory of the camcorder or the “Memory Stick.”
		F.ID	16 characters	—	Sets the File ID.

1) When Y is selected in the camcorder with an optional HKDW-702, the color signal is output from the connector whose selected output signal is a SD signal.
2) When an optional HKDW-702 is installed, the HD-SDI OUT connector (located on the side of the camcorder) can be used as the VBS/SDI output connector.
3) When either 50i or 25PsF is selected, 105.0 is the factory setting.
4) This item is displayed when an optional HKDW-702 is installed.
5) When either 50i or 25PsF is selected, this item is not displayed.

MAINTENANCE Menu

The following table lists and describes the items in the MAINTENANCE menu.
When the setting range in the Settings column is surrounded by parentheses ( ), the setup value is a relative value. The setting range shown on the menu screen may differ from what is shown in the manual.

No.	Page	Item	Settings	Default	Description
M01	WHITE SHADING	SHADING CH SEL	R/G/B/TEST	TEST	Selects the channel adjusted by shading. If TEST is selected, the setting is the same as the setting of OUTPUT SELECT.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
		R/G/B WHT H SAW	(–99 to 99)	0	Adjusts the H Saw white shading compensation.
		R/G/B WHT H PARA	(–99 to 99)	0	Adjusts the H Parabola white shading compensation.
		R/G/B WHT V SAW	(–99 to 99)	0	Adjusts the V Saw white shading compensation.
		R/G/B WHT V PARA	(–99 to 99)	0	Adjusts the V Parabola white shading compensation.
		WHITE SAW/PARA	OFF/ON	ON	Turns white shading Saw and Parabola compensation on and off.

No.	Page	Item	Settings	Default	Description
M02	BLACK SHADING	SHADING CH SEL	R/G/B/TEST	R	Selects the channel adjusted by shading. If TEST is selected, the setting is the same as the setting of OUTPUT SELECT.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
		R/G/B BLK H SAW	(–99 to 99)	0	For H Saw black shading compensation
		R/G/B BLK H PARA	(–99 to 99)	0	For H Parabola black shading compensation
		R/G/B BLK V SAW	(–99 to 99)	0	For V Saw black shading compensation
		R/G/B BLK V PARA	(–99 to 99)	0	For V Parabola black shading compensation
		BLACK SAW/PARA	OFF/ON	ON	Turns black shading Saw and Parabola compensation on and off.
		MASTER BLACK	(–99 to 99)	0	Adjusts the master black level.
		MASTER GAIN(TMP)	–3/0/3/6/9/12/18/ 24/30/36/42 dB	0 dB	Temporarily adjusts the master gain value.
M03	LEVEL ADJ	Y LEVEL	(–99 to 99)	0	Adjusts the chrominance level of the output signal to the TEST OUT connector and to the viewfinder.
		SYNC LEVEL	(–99 to 99)	0	Adjusts the SYNC level of the output signal to the TEST OUT connector and to the viewfinder.
		Pr LEVEL	(–99 to 99)	0	Adjusts the Pr level of the output signal to the TEST OUT connector and to the viewfinder.
		Pb LEVEL	(–99 to 99)	0	Adjusts the Pb level of the output signal to the TEST OUT connector and to the viewfinder.
		OUTPUT SELECT[1)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[2)].
M04	SD LEVEL ADJ[3)]	SD VBS LEVEL	(–99 to 99)	0	Adjusts the V level of the VBS output signal.
		SD VBS SETUP LVL	0% to 7.5%	0%	Selects the setup level of the VBS output signal.[4)]

No.	Page	Item	Settings	Default	Description
M05	BATTERY	BEFORE END 1	5/10/15 to 95/100% (in 5% steps)	5%	Used when a Sony-made battery pack, such as a BP-GL65/GL95, is used. Sets the voltage warning level just before the battery ends.
		END 1	0/1/2/3/4/5%	0%	Used when a Sony-made battery pack, such as a BP-GL65/GL95, is used. Sets the voltage level at which the battery ends and the camcorder stops operation, just before the battery ends.
		BEFORE END 2	11.0 to 17.0 V (in 0.1 V steps)	11.3	Used when a Sony-made battery pack, such as a BP-L60S, is used. Sets the voltage warning level just before the battery ends.
		END 2	10.5 to 11.5 V (in 0.1 V steps)	11.0	Used when a Sony-made battery pack, such as BP-L60S, is used. Sets the voltage level at which the battery ends and the camcorder stops operation, just before the battery ends.
		BEFORE END 3	11.0 to 17.0 V (in 0.1 V steps)	11.8	Used when a battery pack other than a Sony-made one or an external power connected to the DC IN connector is used. Sets the voltage warning level just before the battery ends.
		END 3	10.5 to 14.0 V (in 0.1 V steps)	11.0	Used when a battery pack other than a Sony-made one or an external power connected to the DC IN connector is used. Sets the voltage level at which the battery ends and the camcorder stops operation, just before the battery ends.
M06	AUDIO-1	AUDIO OUT (F/R)	CUE/EE	CUE	Selects the audio output signal during FF/REW. CUE: cue audio signal EE: Input signal
		REC AUDIO OUT	EE/SAVE	EE	Selects the audio output signal during recording. EE: Input signal SAVE: Not output
		CAMERA ADAPTER	ENABL/DSABL	ENABL	When a camera adaptor is connected, selects whether or not to enable input of audio channels 3 and 4 from the camera adaptor. ENABL: Camera adaptor can be used. DSABL: Camera adaptor cannot be used.
		AUDIO CH3/4 MODE	CH1/2/SW	SW	Selects the sources to be recorded on channels 3 and 4. CH1/2: Same sources as channels 1 and 2. SW: Signals selected by the AUDIO IN CH-3/CH-4 switches.
		FRONT MIC REF	–60 dB/–50 dB/–40 dB	–50 dB	Sets the reference level of the front microphone.
		REAR MIC REF	–60 dB/–50 dB/–40 dB	–60 dB	Sets the reference level when the AUDIO IN CH1 or CH2 connector is set to MIC.
		REAR MIC +48V	ENABL/DSABL	ENABL	Selects whether external power is supplied to the external microphone when AUDIO IN CH1 or CH2 connector is set to MIC.
		REC AUDIO DELAY	OFF/1 FLD	OFF	Sets the audio recording phase. OFF: Audio is recorder in the same phase as the video. 1 FLD: Audio is recorded in the phase delayed from the video by one field.

No.	Page	Item	Settings	Default	Description
M07	AUDIO-2	AU REC EMPHASIS	OFF/ON	OFF	Turns the emphasis function on/off.
		CUE REC	OFF/ON	ON	Turns cue audio recording on/off.
		AU REF LEVEL	–20 dB/–18 dB/–16 dB	–20 dB	Sets the audio reference input level.
		AU REF OUT	0 dB/+4 dB/–3 dB	0 dB	Sets the output reference level.
		AU CH12 AGC MODE	MONO/STREO	MONO	Selects the automatic adjustment mode of the input levels of analog audio signals to be recorded on channels 1 and 2; MONO (to independently adjust channel 1 and 2) or STREO (stereo mode).
		AU CH34 AGC MODE	MONO/STREO	MONO	Selects the automatic adjustment mode of the input levels of analog audio signals to be recorded on channels 3 and 4; MONO (to independently adjust channel 3 and 4) or STREO (stereo mode).
		AU AGC SPEC	–6/–9/–12/–15/–17 dB	–6 dB	Sets the AGC characteristics (saturation level).
		AU LIMITER MODE	OFF/–6/–9/–12/ –15/–17 dB	OFF	Sets the limiter characteristics (saturation level) for high-level input signals in manual adjustment of the audio input level.
		AU OUT LIMITER	OFF/ON	ON	Turns the audio output limiter on/off.

No.	Page	Item	Settings	Default	Description
M08	AUDIO-3	AU SG (1kHz)	ON/OFF/AUTO	OFF	Sets whether to output a 1 kHz test tone during the Color Bar mode or not. ON: a 1 kHz test tone is output during the Color Bar mode. OFF: a 1 kHz test tone is not output during the Color Bar mode. AUTO: a 1 kHz test tone is output only when the CH 1 AUDIO SELECT switch on the inside panel is in the AUTO position.
		MIC CH1 LEVEL	SIDE1/FRONT/ F+S1	FRONT	When recording the front microphone sound on audio channel CH-1, select which control is to be used for the level adjustment. SIDE 1: Adjust it with the LEVEL control (left side) on the side panel. FRONT: Adjust it with the MIC LEVEL control on the front panel. F + S1: It can be adjusted using either the LEVEL control (left side) or the MIC LEVEL control. (The two controls are linked to each other.)
		MIC CH2 LEVEL	SIDE2/FRONT/ F+S2	FRONT	When recording the front microphone sound on audio channel CH-2, select which control is to be used for the level adjustment. SIDE 2: Adjust it with the LEVEL control (right side) on the side panel. FRONT: Adjust it with the MIC LEVEL control on the front panel. F + S2: It can be adjusted using either the LEVEL control (right side) or the MIC LEVEL control. (The two controls are linked to each other.)
		REAR1/WRR LEVEL	SIDE1/FRONT/ F+S1	SIDE 1	Selects any of these controls to adjust the audio level of the equipment that is connected to the wireless microphone and whatever is connected to the AUDIO IN CH1 connector on the rear panel. SIDE 1: Adjust it with the LEVEL control (left side) on the side panel. FRONT: Adjust it with the MIC LEVEL control on the front panel. F + S1: It can be adjusted using either the LEVEL control (left side) or the MIC LEVEL control. (The two controls are linked to each other.)
		REAR2/WRR LEVEL	SIDE2/FRONT/ F+S2	SIDE 2	Selects any of these controls to adjust the audio level of the equipment that is connected to the wireless microphone and whatever is connected to the AUDIO IN CH2 connector on the rear panel. SIDE 2: Adjust it with the LEVEL control (right side) on the side panel. FRONT: Adjust it with the MIC LEVEL control on the front panel. F + S2: It can be adjusted using either the LEVEL control (right side) or the MIC LEVEL control. (The two controls are linked to each other.)
		AUDIO SELECT CH3	AUTO/MANU	AUTO	Selects either automatic operation or manual operation to adjust the audio recording level of audio channel 3.
		AUDIO SELECT CH4	AUTO/MANU	AUTO	Selects either automatic operation or manual operation to adjust the audio recording level of audio channel 4.
		LVL CONTROL CH3	0 to 100	70	Adjusts the audio recording level of audio channel 3 in manual operation mode.

No.	Page	Item	Settings	Default	Description
		LVL CONTROL CH4	0 to 100	70	Adjusts the audio recording level of audio channel 4 in manual operation mode.
M09	TIMECODE	TC OUT	AUTO/GENE	AUTO	Selects the time code signal output. AUTO: Outputs the time code generator output during recording and outputs the time code reader output during playback. GENE: Outputs the time code generator output during recording and playback.
		DF/NDF[4)]	DF/NDF	DF	Sets DF or NDF mode. DF: Drop frame mode NDF: Non-drop frame mode
		EXT-LK UBIT	INT/EXT	INT	Sets whether the LTC UBIT setup value locks to an INT or an EXT source when the time code is locked to an external source. INT: Internal lock EXT: External lock
		LTC UBIT	FIX/TIME	FIX	Sets the data to be recorded in UBIT of LTC. FIX: Records the data that is set by the user. TIME: Records the present time.
		VITC UBIT	FIX/TIME	FIX	Sets the data to be recorded in UBIT of VITC. FIX: Records the data that is set by the user. TIME: Records the present time.
		WATCH AUTO ADJ	OFF/ON	ON	Turns the automatic time correction function of the built-in clock on/off. With ON, the time of the built-in clock matches the time data of the user bits of an external time code.
		UBIT GROUP ID	000/101	000	Selects the UBIT GROUP ID.

No.	Page	Item	Settings	Default	Description
M10	VTR MODE	REC TALLY BLINK	OFF/ON	ON	Turns the tally illumination control on/off in the event of BATTERY BEFORE END/TAPE BEFORE END.
		REC START BEEP	OFF/ON	OFF	Turns the alarm sound at REC START/STOP on/off.
		LCD DISPLAY HOLD	TIMER/OFF/CONT	TIMER	Sets the time code (TC) display after power-off as follows. TIMER: The TC display turns off after the elapse of the time set by the LCD HOLD TIMER below. OFF: Not displayed. CONT: Displayed.
		LCD HOLD TIMER	1H/3H/8H	1H	Sets the duration of time after which the TC display is to be turned off after power-off, when LCD DISPLAY HOLD is set to TIMER (H: hours).
		SHOT TIME DISP	MD:HM/DM:HM/ D:HMS	MD:HM	Selects the format of the time to be displayed on the LCD. MD:HM: Month, day, hour, minute DM:HM: Day, month, hour, minute D:HMS: Day, hour, minute, second
		VIDEO OUT (F/R)	EE/PB	EE	Selects the video output signal during FF/REW. EE: Input signal PB: Playback signal
		STBY OFF TIMER	OFF/5MIN/10MIN/ 30MIN/60MIN	60MIN	Sets the length of time for the stand-by off timer when the VTR SAVE/STBY switch is set to STBY.
		STOP KEY FREEZE	OFF/FRAME/ FIELD	OFF	Selects the type of frozen picture to be used when the recorded video signal is stopped by pushing the STOP button during playback.
		EMERGENCY EJECT	ENABL/DSABL	DSABL	Sets whether the emergency cassette ejection is permitted when an error is detected or not. ENABL: Emergency cassette ejection is permitted when any type of error occurs. DSABL: Emergency cassette ejection is prohibited when the tape may be damaged by ejecting the cassette.
M11	SHOT MARKER	LTC UB-MARKER	SET/ALL/OFF	SET	Sets whether to write the markers in UBIT of LTC or not. SET: To independently select the ON/OFF setting of the following items, REC START MARK, SHOT MARK 1, and SHOT MARK 2 ALL: To write REC START MARK, SHOT MARK 1, and SHOT MARK 2 all. OFF: None are written.
		REC START MARK	OFF/ON	OFF	Turns REC START MARK on/off.
		SHOT MARKER 1	OFF/ON	OFF	Turns SHOT MARK 1 on/off.
		SHOT MARKER 2	OFF/ON	OFF	Turns SHOT MARK 2 on/off.

No.	Page	Item	Settings	Default	Description
M12	PRESET WHT	COLOR TEMP <P>	Display color temperature.	3200	White balance preset value
		C. TEMP BAL <P>	(–99 to 99)	0	The color temperature adjustment is not satisfactory with COLOR TEMP <P>, adjust the value more precisely.
		R GAIN <P>	(–99 to 99)	0	R gain preset value
		B GAIN <P>	(–99 to 99)	0	B gain preset value
		5600K <P>	OFF/ON	OFF	Turns the electric 5600K filter on/off.
		AWB ENABLE <P>	OFF/ON	OFF	Turns the function for judging the AWB adjustment when the WHITE BAL switch is set to PRESET on and off.
M13	DCC ADJUST	DCC FUNCTION SEL	DCC/FIX	DCC	Selects the function to be assigned to the DCC switch. FIX is fixed knee.
		DCC D RANGE	400/450/500/550/600%	600%	Sets the dynamic range when the DCC switch is set to the ON position.
		DCC POINT	(–99 to 99)	0	For the DCC minimum knee point adjustment
		DCC GAIN	(–99 to 99)	0	For the gain adjustment to the DCC detected value
		DCC DELAY TIME	(–99 to 99)	0	Adjusts the DCC reaction speed.
		PREKNEE POINT	AUTO/FIX	AUTO	AUTO: Special dark knee point adjustment is done with DCC OFF. FIX: The same preknee point adjustment is done with DCC OFF as with DCC ON.
M14	AUTO IRIS 2	IRIS WINDOW	1/2/3/4/5/6/VAR	1	Selects the auto iris detection window. VAR is variable.
		IRIS WINDOW IND	OFF/ON	OFF	Turns the function which displays a frame marker for the auto iris detection window on and off.
		IRIS LEVEL	(–99 to 99)	0	Adjusts the level of the auto iris target value.
		IRIS APL RATIO	(–99 to 99)	0	Adjusts the mix ratio of the auto iris detection peak value and average value.
		IRIS VAR WIDTH	20 to 479	240	Sets the width and height of the detection frame when the auto iris detection window is set to VAR.
		IRIS VAR HEIGHT	20 to 269	135	Sets the height of the detection frame when the auto iris detection window is set to VAR.
		IRIS VAR H POS.	–460 to 460	0	Sets the horizontal position of the detection frame when the auto iris detection window is set to VAR.
		IRIS VAR V POS.	–249 to 249	0	Sets the vertical position of the detection frame when the auto iris detection window is set to VAR.
		IRIS SPEED	0/1/2/3/4/5	3	Adjusts the auto iris operation speed.
		CLIP HIGH LIGHT	OFF/ON	OFF	Turns the function which, during auto iris adjustment, ignores very bright areas by dulling the reaction to high luminescence on and off.

No.	Page	Item	Settings	Default	Description
M15	FUNCTION 3	WHT FILTER INH	OFF/ON	OFF	Turns the function which inhibits independent white memory for each filter position on and off.
		COLOR BAR SEL	SMPTE/100 %/75 %/4:3-1/4:3-2/4:3-3	100 %	Selects the color bar type.
		SHT DISP MODE	SEC/DEG	SEC	Selects whether to display the shutter speed in seconds or degrees.
		RM COMMON MEMORY	OFF/ON	ON	Selects whether or not to share settings when an RM remote control unit is connected and when the camcorder is used alone.
		VTR START/STOP	RM/PARA/CAM	RM	Selects which VTR START/STOP buttons (on the RM, camera, or both) are enabled when an RM-series remote control unit is connected.
		FAN	OFF/ON/AUTO	ON	OFF: Stops a fan operation. AUTO: Stops a fan operation while the VTR of the camcorder is recording.
		USER & ALL ONLY	OFF/ON	OFF	Selects whether to show only USER, USER MENU CUSTOMIZE, and ALL menus in the top menu.
		HD SDI REMOTE I/F	OFF/CHARA/G-TLY/R-TLY	OFF	Selects the setting when recording as synchronizing with multiple HDW-S250/S280 cassette recorders by superimposing the trigger signal on the output signal from the HD-SDI OUT connector. OFF: Does not carry out synchronous recording. Selects the display method when the recording trigger signal is output from the HD-SDI OUT connector (when an HDW-250/S280 is recording). CHARA: REC 2 is displayed on the display section of the viewfinder. G-TYL: The green tally is turned on. R-TLY: The REC tally is turned on. Pay attention to the fact that this REC tally is lit even when a cassette is not loaded in the camcorder.
		SD ASPECT PULSE[3), 4)]	OFF/ON	OFF	Selects whether the 16:9 (SQEZE) signal is superimposed on the VBS/SDI output signal from the HD-SDI OUT connector located on the side of the camcorder when an optional HKDW-702 is installed.[2)]
M16	FUNCTION 4	WHITE GAIN RANGE	WIDE/NRW	WIDE	Specifies the settable range of white gain. WIDE: –30 dB to +7 dB NRW: –7 dB to +7 dB
M17	GENLOCK	GENLOCK	OFF/ON	ON	Turns genlock on and off.
		RETURN VIDEO	OFF/ON	OFF	Turns return video on and off.
		GL H PHASE COASE	(–99 to 99)	0	Adjusts the genlock H phase.
		GL H PHASE FINE	(–99 to 99)	0	Adjusts the genlock H phase.
M18	ND COMP	ND OFFSET ADJUST	OFF/ON	—	Turns the mode which sets ND (neutral density) filter color compensation values on and off.
		CLEAR ND OFFSET	—	EXEC	Clears ND filter color compensation values.

No.	Page	Item	Settings	Default	Description
M19	FORMAT	CURRENT	(Display only)	—	Displays the currently selected frame frequency.
		NEXT	59.94/50i/25PsF	59.94/50i 5)	Selects the frame frequency. The selected frame frequency becomes effective after the power is turned off and then on again.
M20	VANC RX	UMID LINE1	0, 9 to 20	0	Selects the line on which the UMID is to be recorded (First field). When 0 is selected, the UMID is not recorded.
		UMID LINE2	0, 564 to 593	0	Selects the line on which the UMID is to be recorded (Second field). When 0 is selected, the UMID is not recorded.

1) When Y is selected in the camcorder with an optional HKDW-702, the color signal is output from the connector whose selected output signal is an SD signal.
2) When an optional HKDW-702 is installed, the HD SDI OUT connector (located on the side of the camcorder) can be used as the VBS/SDI output connector.
3) When an optional HKDW-702 is installed, this item is displayed.
4) When either 50i or 25PsF is selected, this item is not displayed.
5) 59.94 is the default value for the HDW-790, and 50i is the default value of the HDW-790P.

FILE Menu

The following table lists and describes the items in the FILE menu.
When the setting range in the Settings column is surrounded by parentheses ( ), the setup value is a relative value. The setting range shown on the menu screen may differ from what is shown in the manual.

No.	Page	Item	Settings	Default	Description
F01	USER FILE1)	USER FILE LOAD	—	EXEC	*See "6-1 Saving and Loading User Files" on page 108.*
		USER FILE SAVE	—	EXEC	
		F. ID	16 characters	—	
		USER PRESET	—	EXEC	*See "5-4 Resetting USER Menu Settings to the Standard Settings" on page 106.*
F02	USER FILE2	STORE USR PRESET	—	EXEC	Sets the pages registered in the USER menu to the standard setting.
		CLEAR USR PRESET	—	EXEC	Clears the standard setting of pages registered in the USER menu.
		CUSTOMIZE RESET	—	EXEC	Returns pages and items registered in the USER menu to the factory default state.
		LOAD CUSTOM DATA	OFF/ON	OFF	Selects whether to read the USER MENU CUSTOMIZE settings to be loaded by USER FILE LOAD.
		LOAD OUT OF USER	OFF/ON	OFF	Selects whether to read pages not registered by USER FILE LOAD.
		BEFORE FILE PAGE	OFF/ON	OFF	Selects whether to read data after USER FILE pages by USER FILE LOAD.
		USER LOAD WHITE	OFF/ON	OFF	Selects whether to read white balance data by USER FILE LOAD.

No.	Page	Item	Settings	Default	Description
F03	ALL FILE	ALL FILE LOAD	—	EXEC	Loads the ALL file.
		ALL FILE SAVE	—	EXEC	Saves the ALL file.
		F. ID	16 characters	—	To name the ALL file.
		ALL PRESET	—	EXEC	Returns items in the ALL file to preset values.
		STORE ALL PRESET	—	EXEC	Sets the preset values of items in the ALL file.
		CLEAR ALL PRESET	—	EXEC	Clears the preset values of items in the ALL file.
		3SEC CLR PRESET	OFF/ON	OFF	Turns the function to clear the standard setting when the MENU knob is kept pressed for 3 seconds on and off.
F04	SCENE FILE	1	—	—	*See "6-2 Saving and Loading Scene Files" on page 112.*
		2	—	—	
		3	—	—	
		4	—	—	
		5	—	—	
		STANDARD	—	—	
		SCENE RECALL	—	EXEC	
		SCENE STORE	—	EXEC	
		F. ID	16 characters	—	
F05	REFERENCE	REFERENCE STORE	—	EXEC	Saves the reference file in internal memory.
		REFERENCE CLEAR	—	EXEC	Clears the reference file.
		REFERENCE LOAD	—	EXEC	Loads the reference file.
		REFERENCE SAVE	—	EXEC	Saves the reference file to a "Memory Stick."
		F. ID	16 characters	—	To name the reference file.
		SCENE WHITE DATA	OFF/ON	OFF	*See "White balance setting data to be saved in the scene file" on page 113.*
F06	LENS FILE 1	LENS FILE RECALL	—	EXEC	Loads lens files.
		LENS FILE STORE	—	EXEC	Saves lens files.
		F. ID	16 characters	—	To name lens files.
		SOURCE	—	MEMORY1	Number of selected lens file
		LENS NO OFFSET	—	EXEC	To clear lens files.
		LENS AUTO RECALL	OFF/ON	ON	Turns the automatic recall function for serial lens on and off.
		L. ID	(Display only)	—	To show the lens-specific ID (when a serial lens is connected).
		L. MF	(Display only)	—	To show the name of the lens manufacturer (when a serial lens is connected).

No.	Page	Item	Settings	Default	Description
F07	LENS FILE 2	LENS M VMOD	(–99 to 99)	0	For lens file V Saw shading
		LENS CENTER H	–480 to 479	0	For the horizontal position compensation of lens file center marker
		LENS CENTER V	–270 to 269	0	For the vertical position compensation of lens file center marker
		OUTPUT SELECT[3)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[4)].
		LENS R FLARE	(–99 to 99)	0	Adjusts the lens file flare (R).
		LENS G FLARE	(–99 to 99)	0	Adjusts the lens file flare (G).
		LENS B FLARE	(–99 to 99)	0	Adjusts the lens file flare (B).
		LENS W-R OFST	(–99 to 99)	0	Adjusts the white R compensation value for the lens file.
		LENS W-B OFST	(–99 to 99)	0	Adjusts the white B compensation value for the lens file.
F08	LENS FILE 3	SHADING CH SEL	R/G/B/TEST	R	Selects the channel adjusted by shading. If TEST is selected, the setting is the same as the setting of OUTPUT SELECT.
		OUTPUT SELECT[3)]	Y/R/G/B	Y	Selects the output signal from the TEST OUT connector, the input signal to the viewfinder, and the output signal from the VBS/SDI OUT[4)].
		LENS R/G/B H SAW	(–99 to 99)	0	For the H Saw white shading compensation for the lens file
		LENS R/G/B H PARA	(–99 to 99)	0	For the H Parabola white shading compensation for the lens file
		LENS R/G/B V SAW	(–99 to 99)	0	For the V Saw white shading compensation for the lens file
		LENS R/G/B V PARA	(–99 to 99)	0	For the V Parabola white shading compensation for the lens file
		IMAGE INVERT[5)]	OFF/ON	OFF	Turns the image inversion function on/off.
F09	MEMORY STICK	M.S. FORMAT	—	EXEC	Formats a “Memory Stick.”
		M.S. IN > JUMP TO	OFF/USER/ ALL/SCENE/ LENS/REFER/ USER1	OFF	*See “6-3 Jumping to a File-Related Menu Page When Inserting a “Memory Stick”” on page 116.*
F10	TELE FILE	TELE FILE CLEAR	—	EXEC	*See “3-4 Recording the Recording Start Time Code onto the Memory Label — Tele-File” on page 53.*
		TELE FILE MARK	OK/NG/KP	OK	
		ID	20 characters	—	
		SIZE	0 to 9999	KBYTE	
		REMAIN	0 to 100	%	
		STATUS	STANDBY/NO LABEL/ WRITE PROTECT/ UNKNOWN FORMAT/ UNFORMAT/ MEMORY FULL/NEAR FULL	—	Displays the status under which the Tele-File mark function is to be used.

1) This USER FILE page has been also registered in the USER menu at the factory. This, you can access this page without accessing the TOP menu.
2) Displays only when a “Memory Stick” in which user gamma files are stored is inserted.
3) When Y is selected in the camcorder with an optional HKDW-702, the color signal is output from the connector whose selected output signal is an SD signal.
4) When an optional HKDW-702 is installed, the HD-SDI OUT connector (located on the side of the camcorder) can be used as the VBS/SDI output connector.
5) This item is displayed when an optional HKDW-905R is installed.

DIAGNOSIS Menu

The following table lists and describes the items in the DIAGNOSIS menu.

No.	Page	Item	Description
D01	HOURS METER	RESET METER	Resets the resettable meters (-2).
		DRUM RUNNING	Displays the total time the drum has rotated.
		TAPE RUNNING	Displays the accumulated time the tape has run.
		OPERATION	Display the time that the unit has been powered on.
		THREADING	Displays the number of times of tape threading.
		DRUM RUNNING-2	Displays the total time the drum has rotated (reset possible).
		TAPE RUNNING-2	Displays the accumulated time the tape has run (reset possible).
		OPERATION-2	Displays the times that the unit has been powered on (reset possible).
		THREADING-2	Displays the number of times of tape threading (reset possible).
D02	TIME/DATE	ADJUST	*See "5-3-6 Setting the Date/Time of the Internal Clock" on page 98.*
		HOUR	
		MIN	
		SEC	
		YEAR	
		MONTH	
		DAY	
D03	ROM VERSION	AT: Ver. X.XX	Displays the ROM version.
		SS: Ver. X.XX	
		FP: Ver X.XX	
		AU DSP: Ver X.XX	
		EQ: Ver X.XX	
D04	DEV STATUS	I/O EEPROM LSI NVRAM SCI	Displays the self diagnosis.
D05	OPTION BOARD	DOWN CONVERTER	Displays the installed options.
		PICTURE CACHE	
		SLOW SHUTTER	

About a “Memory Stick”

What is “Memory Stick”?

“Memory Stick” is a new compact, portable and versatile IC (Integrated Circuit) recording medium with a data capacity that exceeds a floppy disk. “Memory Stick” is specially designed for exchanging and sharing digital data among “Memory Stick” compatible products. Because it is removable, “Memory Stick” can also be used for external data storage.
“Memory Stick” media are available in three sizes: standard size, compact “Memory Stick Duo” size, and the smallest “Memory Stick Micro” (“M2”[1)]) size. Once attached to a Memory Stick Duo adapter, a “Memory Stick Duo” is the same size as a standard “Memory Stick,” and as a result can be used with products requiring a standard “Memory Stick.” Also, once attached to a standard-size M2 adaptor, a “Memory Stick Micro” is the same size as a standard “Memory Stick,” and as a result can be used with products requiring a standard “Memory Stick.”

1) “M2” is an abbreviation for “Micro Memory Stick.”

Types of “Memory Stick”

“Memory Stick” is available in the following six types to meet various requirements in functions.

“Memory Stick”

Stores any type of data except copyright-protected data that requires the “MagicGate” copyright protection technology.

“MagicGate Memory Stick”

Equipped with the “MagicGate” copyright protection technology.

“Memory Stick” (“MagicGate”/High-Speed Transfer Compatible)

Equipped with “MagicGate” copyright protection technology and allows high-speed data transfer.
This type of “Memory Stick” can be used with products requiring a “Memory Stick,” “MagicGate Memory Stick,” and “Memory Stick PRO.”[1)]
Your camcorder is not compliant with high-speed data transfer with this type of “Memory Stick.”

1) Operation is not guaranteed for all of the compliant products (Some products may not accept this type of “Memory Stick.”)

“Memory Stick-ROM”

Stores pre-recorded, read-only data. You cannot record on “Memory Stick-ROM” or erase the pre-recorded data.

“Memory Stick” (with Memory Select Function)

Composed of multiple 128 MB memory units.
The mechanical switch at the back of the “Memory Stick” allows you to select the memory unit to be used depending on usage.
The memory units cannot be used simultaneously and continuously.

“Memory Stick PRO”

“Memory Stick” with “MagicGate” copyright protection technology, exclusive for “Memory Stick PRO”-compliant products.

Available types of “Memory Stick”

You can use a “Memory Stick” or a “MagicGate Memory Stick” with your camcorder.
(32, 64 and 128 MB compatible)

Note

You can not use a “Memory Stick Duo” alone with your camcorder. To use a “Memory Stick Duo” with your camcorder, you must attach it to an optional Memory Stick Duo Adaptor. If you insert a “Memory Stick Duo” without the adaptor, it may become stuck in the slot and be impossible to remove.

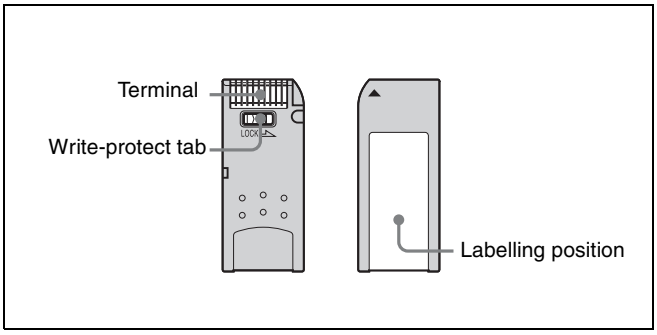
Note on data read/write speed

Data read/write speed may vary depending on the combination of the “Memory Stick” and “Memory Stick” compliant product you use.

What is “MagicGate”?

“MagicGate” is copyright protection technology that uses encryption technology.

Before using a “Memory Stick”



- When you set the “Memory Stick” erasure prevention switch to “LOCK,” data cannot be recorded, edited, or erased.
- Data may be damaged if:
  —You remove the “Memory Stick” or turn off the unit while it is reading or writing data.
  —You use the “Memory Stick” in a location subject to the effects of static electricity or electric noise.
- We recommend that you make a backup copy of important data that you record on the “Memory Stick”.

Notes

- Do not attach anything other than the supplied label to the “Memory Stick” labeling position.
- Attach the label so that it does not stick out beyond the labeling position.
- Carry and store the “Memory Stick” in its case.
- Do not touch the connector of the “Memory Stick” with anything, including your finger or metallic objects.
- Do not strike, bend, or drop the “Memory Stick”.
- Do not disassemble or modify the “Memory Stick”.
- Do not allow the “Memory Stick” to get wet.
- Do not use or store the “Memory Stick” in a location that is:
  —Extremely hot, such as in a car parked in the sun
  —Under direct sunlight
  —Very humid or subject to corrosive substances

ACCESS Indicator

If the access indicator is turned on or is flashing, data is being read from or written to the “Memory Stick”. At this time, do not shake the computer or product or subject them to shock. Do not turn off the power of the computer and product or remove the “Memory Stick”. This may damage the data.

Precautions

- To prevent data loss, make backups of data frequently. In no event will Sony be liable for any loss of data.
- Unauthorized recording may be contrary to the provisions of copyright law. When you use a “Memory Stick” that has been pre-recorded, be sure that the material has been recorded in accordance with copyright and other applicable laws.
- The “Memory Stick” application software may be modified or changed by Sony without prior notice.
- Note that there are certain restrictions on recording stage performances and other entertainment events, even if they are recorded for personal use only.

- “Memory Stick”, MEMORY STICK and “MagicGate Memory Stick” are trademarks of Sony Corporation.
- “Memory Stick Duo” and MEMORY STICK DUO are trademarks of Sony Corporation.
- “Memory Stick PRO” and MEMORY STICK PRO are trademarks of Sony Corporation.
- “Memory Stick PRO Duo” and MEMORY STICK PRO DUO are trademarks of Sony Corporation.
- “Memory Stick-ROM” and MEMORY STICK-ROM are trademarks of Sony Corporation.
- “MagicGate Memory Stick” is trademark of Sony Corporation.
- “MagicGate” and MAGICGATE are trademarks of Sony Corporation.

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http://pro.sony.com.cn

Sony Corporation

http://www.sony.net/

HDW-790/790P
(SY)
3-994-220-**02** (1)

Printed on recycled paper.

Printed in Japan
2008.02.13
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